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Mink Raising

By Charles E. Kellogg, Charles F. Bassett, and Robert K. Enders[1]

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[1] Mr. Kellogg, acting in charge of Fur Farming Investigations, Beltsville, Md.; Mr. Bassett, director of the Fur Animal Experiment Station, Ithaca, N. Y.; and Dr. Enders, in charge of investigations on fur animals, Swarthmore College, Swarthmore, Pa., are all in the Animal and Poultry Husbandry Research Branch, Agricultural Research Service.

HISTORY AND BASIC CONSIDERATIONS

Minks were first raised in captivity for the production of fur in the United States in 1866. For some time the interest in raising minks was dependent more on the pressure applied by promoters than on prices received for the pelts. In later years, however, the accumulated knowledge of proper methods of breeding, feeding, and management has put operations on a sounder basis because of the greater number of pelts that can be produced, the improved quality of pelts, and the lower costs of producing pelts which are used primarily for making coats, capes, and trimmings.

The first ranch-raised mink skins were of a decidedly inferior quality, but in recent years the average quality of natural-colored skins produced on farms is superior to that of skins taken in the wild. This is to be expected because observant and efficient mink raisers can improve the quality of their animals by controlled selective matings, proper and regular feeding, and intelligent management. In recent years mink raisers have become particularly interested in raising mutations of various colors, because such pelts bring higher prices.

Mink farming on a commercial scale is of such recent growth that new and better methods of feeding, breeding, and management are being continually developed through research and in practice on fur farms. Information on new practices may be found in fur-farming journals.

According to the 1940 census there were 2,836 mink farms in 42 States. On April 1, 1940, there were 161,457 female minks more than 3 months old, and the number of minks of both sexes pelted in 1939 was 291,324. Young animals are pelted the fall following birth or at about 7 to 8 months old. Wisconsin, with 565 mink farms, led all the States with 44,437 mature female minks and 93,500 animals pelted in 1939. Minnesota and New York were second and third, respectively. Oregon came fourth, with 24,550. In recent years The National Board of Fur Farm Associations has collected detailed data annually. In 1952 there were 2,500,000 minks produced in the United States. The mutation skins, comprising 61 percent of the total production, averaged $24.95 and the natural darks $14.59, making a general average of $19.46. In round numbers the percentages of the more common mutations were: Pastel, 24 percent; Platinum, 13 percent; and Sapphires, 7 percent. New mutations are being developed each year and the percentages will vary in accordance with popular demand. These surveys showed that at the end of 1952 there were approximately 5,000 mink ranches in the United States. Nearly 42 percent of the United States mink ranches produce less than 100 kits each year. Almost 10 percent, or about 500 ranches, produced over half of the pelt crop in 1951. Several ranches produce more than 5,000 kits annually.

In all business undertakings a point is eventually reached at which the inefficient producer will not make a profit. Mink raising is no exception. There should be, however, a satisfactory market for high-quality mink pelts at all times. Any person who contemplates entering this business should bear in mind that it does not yield quick riches, and that market skins must be produced under constantly increasing competition. Good judgment dictates, therefore, that a person should begin raising minks only if he is determined to make the undertaking a permanent enterprise based on the marketing of pelts.

Some States require licenses for raising fur animals in captivity. Information on this matter can be obtained from any State game commission. Some towns also have restrictive ordinances.

If, after due consideration, these general points have been satisfactorily analyzed, the prospective mink raiser can then consider the details.

LOCATING THE RANCH

The beginner should observe the following general basic principles in selecting a location for his mink ranch.

In the United States most of the ranch-raised minks are produced either in the northern half of the country, elsewhere at high altitudes, or in cool humid regions near large bodies of water. The colder climates and shore areas apparently tend to cause a better development of fur.

Submarginal land is adequate for raising minks. Sandy or sandy loam soil is advantageous in providing good drainage. It is best to place pens and buildings on gentle slopes where snow does not drift too deeply and where surface water runs off quickly.

Minks do not require running water in which to swim; in fact, many mink raisers believe that water is harmful to the production of good pelts and apt to cause pneumonia. An adequate supply of good water, however, is necessary for the proper mixing of feed, complete sanitation, and proper refrigeration. The location of cold-storage facilities in nearby towns will provide additional facilities in case the refrigeration system on the home ranch fails to function properly.

Since raw meat and packing-house byproducts, or these and fish or fish scraps, usually constitute more than 50 percent of the mink ration, a cheap source of supply should be available. Mink owners have organized cooperative fur animal feed-mixing and distributing plants in several States. Locating the mink farm on a route along which such services are supplied may reduce the feed costs and the necessity of installing expensive refrigeration equipment. A source of adequate and cheap electrical power is another essential for economy and efficiency of ranch operations.

SELECTION OF BREEDING STOCK

Many who start mink ranching know very little about the selection of the animals upon which their future herd will be built, and hence must depend largely upon the guidance of others. It is very important to purchase the foundation animals from a reliable breeder who is producing the kind of pelts the market desires. Names of such breeders may be obtained from advertisements in the various trade periodicals, from the fur-auction companies, or from farmers' organizations. The Department of Agriculture can furnish a list of organizations but does not maintain a list of breeders or furnish information as to the integrity or financial standing of any individual or concern. Much valuable information can be obtained by visiting some of the best ranches and raw-fur dealers making a specialty of mink skins and by attending live-mink and pelt shows and fur auction sales.

In the selection of stock, besides knowing the individuality of the animals, the rancher should give particular attention to an adult mink's past breeding performance, or in the case of a kit, to the prolificacy of the parents, and to constitutional vigor and freedom from disease. Most satisfactory results will be attained by the beginner if one male is bought for every two females. Later it may be found that fewer males are needed. Good, selected breeding stock will cost two or three times the value of the pelt it carries. It will pay to invest only in high-class animals. If the individual mink rancher expects to produce fine-quality pelts he should follow a program of continuous herd improvement and remove from the breeding pens any animals that do not measure up to the highest standards. With the return of normal economic conditions he should then be in a position to expand rapidly with choice quality animals.

There has been considerable controversy about the relative qualities of Eastern, Yukon, and Laborator strains of mink. In more recent years these strains have been crossed to such an extent that their differences are rapidly being eliminated. The male mink is much larger than the female. The most desirable animals are those with a thin but not papery skin, dense fur of rich tones of the desired color, the underfur having a typical color and appearance throughout its entire length. This combination gives contrast or character to mink skins. Underfur that is banded or that shows a faded off-color at the tips is very undesirable. The guard hair should be abundant enough to give a nice coverage or veiling of the underfur, which in turn should be dense enough to support the guard hair. Pelts having underfur about five-eighths of an inch long and guard hairs approximately half again as long are the most valuable on the market. All these points can best be judged in the fall, just before pelting time.

The foundation stock of the mink industry is the standard or natural colored mink even though some of the more popular mutations are produced in greater numbers. Color, texture, density, and all other desirable qualities must be built into the breeding herd through selective matings.

Mutations

It is generally considered advisable for a beginner to acquire his knowledge with natural-colored mink as breeding animals of this kind are not so expensive as others. One can digress from these to any of the mutations by purchase of males of the more expensive mutations. It is possible, through additional years of selective breeding, that the qualities of each kind of mutation will be so improved that resort to back crossing to the natural mink will no longer be necessary.

The general principles of the laws of inheritance, as explained later, must be understood to recover the proper colors from subsequent matings. Quicker progress will be made, however, if pure breeding mutations (without lethal factors) are purchased as the initial stock. The better ranchers having mutations are continually breeding their strains to higher levels of quality.

The Platinum was the first mink mutation to be produced in quantity. The guard hair is silvery blue in color, free from any brownish cast. The underfur should be of a sky-blue color. This contrast in

guard hair and underfur makes for a desirable pelt. The skins from these animals sell under the trade-mark of Silverblu (fig. 1). About 100,000 Silverblu skins were produced in 1947 in the United States. There are three different classifications in the fur shows—dark, medium, and light. The medium shade is most desirable. Platinum is recessive to normal color in minks and consequently platinum animals will breed true.

Another recessive of recent origin is the Pastel, frequently known

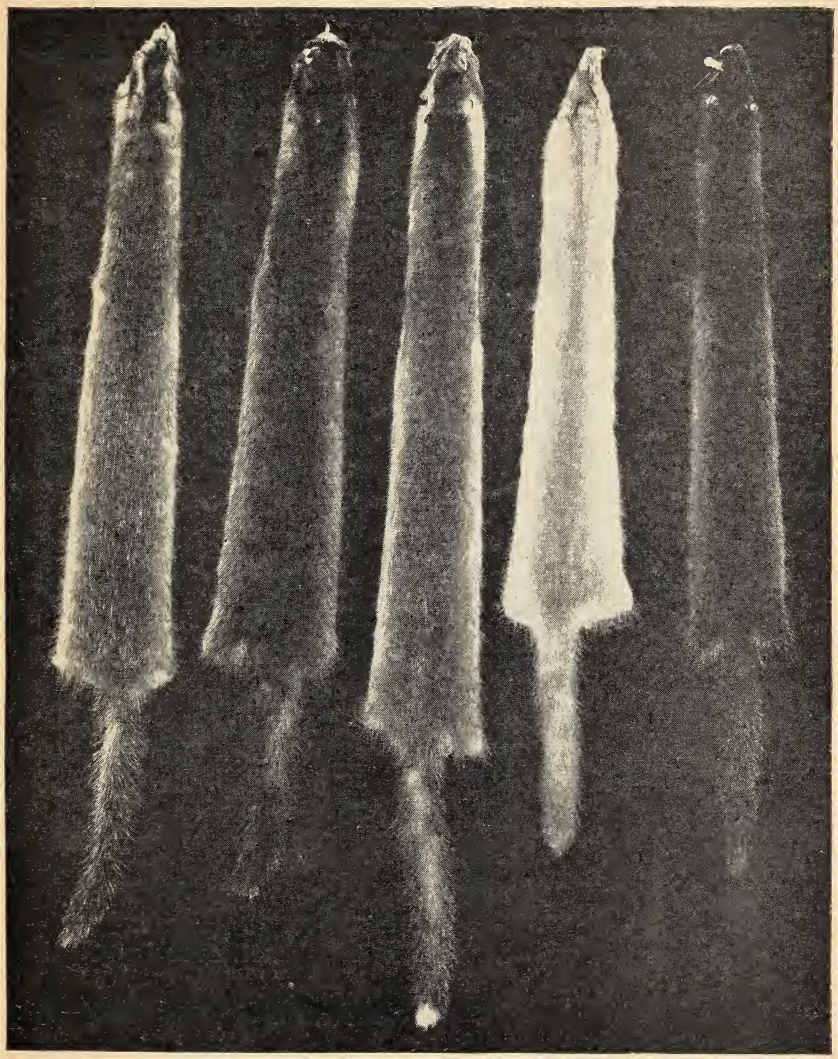

FIGURE 1.—Several types of dressed mutation mink skins. Size differences are largely due to sex and method of stretching. From left to right: Light Blufrost, dark Blufrost, Breath of Spring Silverblu (resulting from crossing Platinum with Silver Sable), Silverblu, and Martone.

as the "blond." The skins are sold under the trade-mark Royal Pastel. It is a diluted brown. The first auction sale was in 1945, with an offering of only 2,500. In 1947, 19,000 of these skins were produced.

The first dominant mink mutation to be developed commercially was the Black Cross. About 40,000 of these skins, known as Royal Kohinur and Kohinur, were offered for sale in 1945. This is essentially a white animal with varying degrees of black and also white guard hairs distributed along the back and sides, which form a cross at the shoulders. A uniform rather than a patchy distribution of these guard hairs is desirable. The spotting effect should be avoided. Later studies showed that the commercial skins are from hybrid animals, i.e., carrying factors for natural color. The pure Black Cross animal is all white except for small, dark areas on head and rump. Since Black Cross is dominant to natural color in mink, a large number of the Kohinur skins (hybrid Black Cross) can be produced by mating a pure Black Cross male to natural colored females. Kohinur skins are not popular with the trade.

Silver Sable is dominant to natural color in mink. The skins of this mutation are known as Blufrost. Animals of this kind are thought to exist only in the hybrid condition since those pure for this characteristic apparently do not survive. The degree of silvering varies considerably and the colored guard hairs vary from brown to very dark. Some of the guard hairs are silvered and the underfur is lighter blue in color than that of the natural-colored mink. Though Blufrost skins are not popular with the trade, these Silver Sable animals are useful in developing new types.

Other mink mutations are being developed (for both recessive and dominant characters) as well as combinations of all of them. The average breeder will do well to leave this experimental breeding to the more experienced. It is confusing that in some cases different names apply to the same mutations.

The Mutation Mink Breeders Association has controlled the marketing of mutation mink skins through the large fur auction companies. Such concentration of widely varying skins from small producers permits sale lots of matched skins in quantities suitable for making coats. The skins are usually sold dressed, but there is a trend towards selling them raw with fur in. The Mutation Mink Breeders Association also has put on an extensive advertising campaign.

EQUIPMENT

Individual Pens

Many types of pens are in use and have proved satisfactory. It is best to provide a pen for each breeding animal, male or female (fig. 2).

The individual-type pen, as the name implies, is designed for one mink. Pens of this type are inexpensive and easy to construct. They are relatively light and can be moved easily. The caretaker, however, is afforded no protection from the weather, and the upkeep and repair of such pens is rather expensive. Individual pens can be made by shaping 16-gage 1-inch mesh, woven wire, galvanized after weaving, into boxlike enclosures 4 feet long, 1½ feet wide, and 14 to 18 inches

high. Wire ends are added, and a hole is cut in one end to allow access to the nest box, which is hung securely on the outside. An 8-inch or 10-inch board, with an opening located equidistant from each end, fastened to one end of the pen provides support and a method of attachment for the nest box.

An 8- by 8-inch feeding platform fastened in one corner of the pen and suspended from the top at one corner is commonly used. Pregnant minks should have considerably larger pens to accommodate the young to about 8 weeks of age. An opening in the top of the pen or

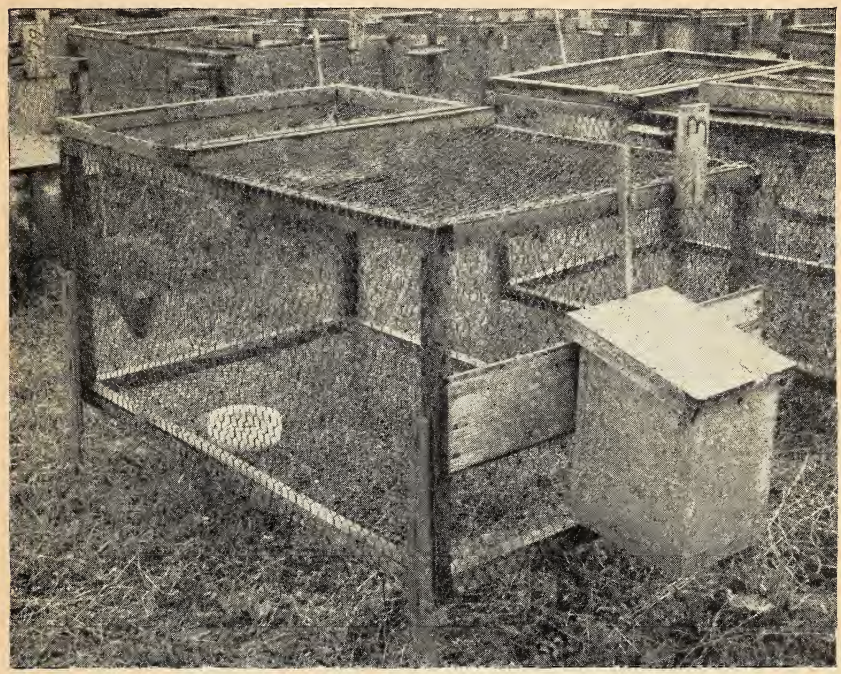

FIGURE 2.—Individual outdoor mink pen showing nest box, water or feed crock, water pan hanging at left end, and suspended feeding platform in far corner. Note that legs can be removed to lower pen to the ground.

at one end may be provided for convenience in feeding or catching the animals. All openings should be properly reinforced with wooden strips on the outside. All rough, twisted ends of wire should be on the outside.

The nest box opening and the corresponding one for the pen should be 3½ to 4½ inches in diameter, depending upon the size of the mink. If desired, the edges of the openings may be covered with galvanized sheet metal to prevent chewing, since any rough surfaces may cause considerable damage to the pelt. Exposed wooden surfaces should be protected from chewing by covering with either galvanized sheet metal or wire mesh.

Individual pens are generally constructed without legs. If placed on 2- by 4-inch frames fastened to locust, cedar, or steel posts which

have been set in the ground, such pens acquire a semipermanent character, are largely self-cleaned as they are located above the ground, and present a uniform appearance. The pen may be attached by means of staples to the four legs, or stakes, driven into the ground. Thus it can easily be lowered and kept on the ground from 1 week before to 3 weeks after whelping, so that the young will not fall through the wire and be lost. Removable solid floors will accomplish the same purpose. Tubular wire pens of approximately the same dimensions have been used also. Some ranchers house their individual pens in open-sided sheds, which furnish weather protection at fairly low cost.

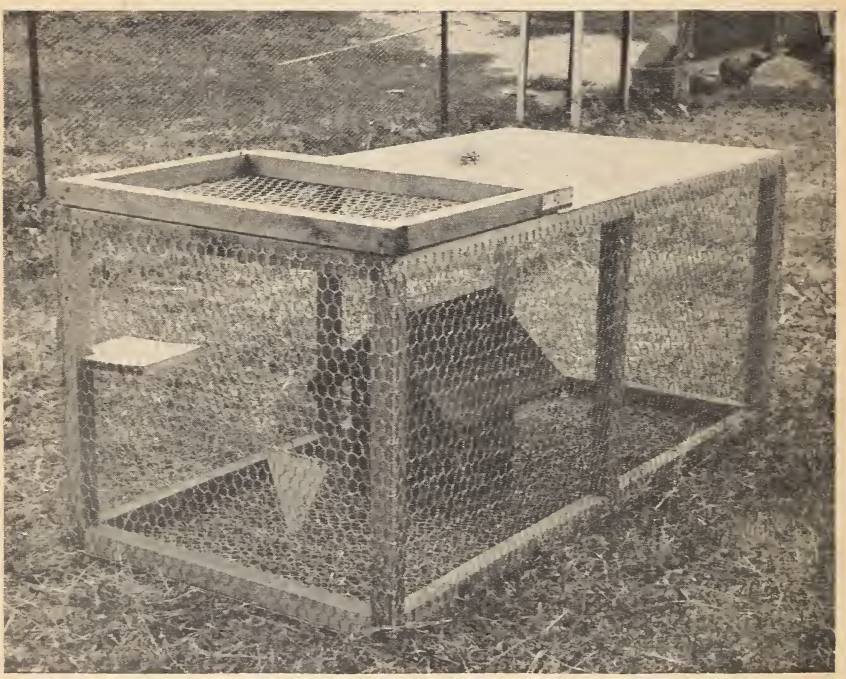

FIGURE 3.—Individual mink pen set on the ground and having gable roof type of nest box inside. The covered part of the pen furnishes shade and protection from rain. Note the feeding platform at left and water pan in foreground.

A commonly used type of outdoor nest box has a gable roof with entrances at the peak at each end. One side of the roof is hinged at each end by means of a small triangular piece of galvanized sheet metal attached at the gable edge of the movable side by two nails and to the edge of the stationary side by one nail near the extreme point of the metal. This permits half the roof to be lifted for putting in bedding or for examining the animals. The body of this nest box is about 10 inches square and 16 inches deep. It is set inside the individual outdoor pens and may be laid on its side to make it easier for the young mink to enter. Another type of nest box is shown in figure 3.

Colony Houses

The use of colony houses also permits the individual penning of animals. Each pen is an integral part of the building (fig. 4) and large numbers of animals are thus housed under protective sheds where they can be easily cared for. Of course, colony houses require a greater initial outlay of capital, but because of their permanency the actual yearly cost of penning a mink when considered over a long period is no more than that of the individual cage. In addition, the caretaker is protected from the weather during much of the time he is working.

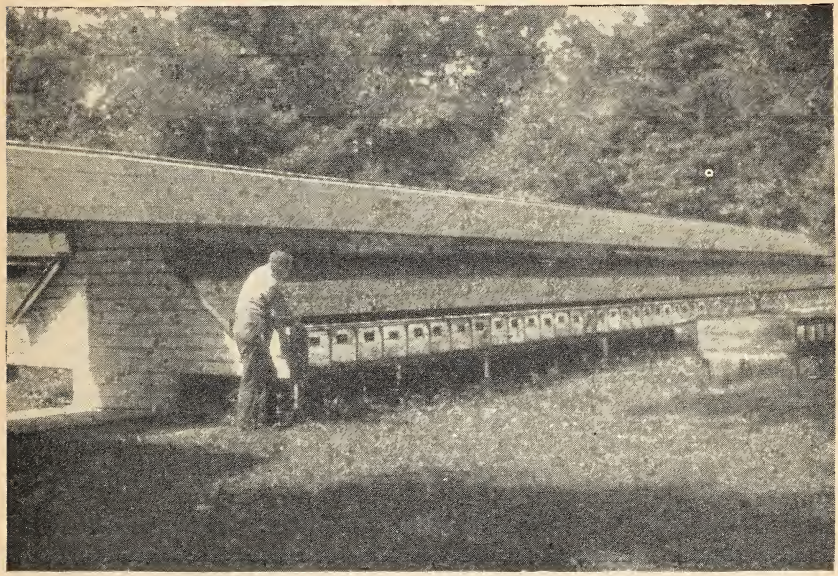

Figure 4.—Colony house for mink. It has 80 pens on each side. Caretaker is shown turning on the water system to fill all 80 water dishes along one side of the house.

Colony houses or sheds have given excellent service at the former U. S. Fur Animal Experiment Station, Saratoga Springs, N. Y. Each building is 120 feet long, 15 feet wide, and contains a total of 160 pens, 80 on each side. Each colony house has a 5-foot escape-proof alley. The floor, top, and outside end of the pens are made of 16-gage, ¾- by 1-inch hexagonal-mesh wire, galvanized after weaving, and the floors are approximately 2 feet above the ground. Fifteen-gage welded wire with 1- by 1-inch mesh also may be used. The pens are 5 feet long, 18 inches wide, and 14 inches high and have solid wooden partitions made from 1-inch dressed shiplap. Wooden partitions are preferred to those of wire, not only because they prevent fighting between animals of adjoining pens, but primarily because the nervous running actions of one individual is hidden from the others. This is particularly desirable during the whelping and suckling

periods, when one hungry, squeaking kit can soon have the entire house aroused and excited.

About half of each pen extends beyond the roof of the colony house to allow access to sunshine. When the sun is too hot, artificial shade may be provided by covering the pens with roofing paper.

After the concrete alley floor, the inner walls, and the outer footings, 6 feet apart, have been poured and allowed to harden, the framework is constructed so that the floor of 5-foot wire can be unrolled the entire length of the building. There should be crosspieces every 3 feet to support the wire floor properly. All edges of the framework supporting the wire floor should be beveled to prevent accumulation of droppings on the top edge. Dressed shiplap, to the desired height of the pens, is nailed to the outside of the studding forming the alleyway and all the dressed shiplap partitions are put into place, reinforced by a recessed strip along outer top edge, and another 5-foot roll of wire provides the outer ends and part of the top of all pens. Along the top of the partitions, 2- by-4-inch boards may be placed on edge 27 inches from the inner ends of the pens, to serve both as a surface to which the wire netting of the pen top can be stapled from underneath and as a bearing surface for the rafters forming that part of the pen roof.

The part of each pen underneath the roof has a gate or lid of woven wire made so that the side pieces of the frame extend beyond the crosspiece and thus permit the gate to be held down under the 2- by 4-inch piece supporting the outer edge of the roof. An 8-penny nail placed in a hole drilled into the back of the pen and the back edge of the gate frame forms an effective gate fastener.

Doors should be provided at each end of the shed. Suitable ventilators should be made in the roof and all openings should be escapeproof.

Where electricity is available the colony-type mink house should be wired for lighting. Artificial lighting is often needed for the morning and evening feeding operations and on dark days during the breeding season.

Nest boxes in use in the colony house at the station are purposely made deep to prevent the kits from crawling out before they are able to take care of themselves (fig. 5). The increased depth allows a warm nest to be built close to the bottom of the nest box and under several inches of bedding where the young can remain comfortable and undisturbed. As they grow older and the days become warmer, the mother brings the young up to the top of the bedding, where the air is cooler. Fronts and backs are made of 12-inch dressed white-pine boards 18 inches long. Entrance holes in each front are 3½ to 4½ inches in size, centered 12 inches up from the bottom, and 6 inches in from the sides. The sides, which are 16 inches long, are made of 10-inch boards. The bottom and the top or cover also are made of 10-inch boards, 11½ inches long. The bottom is fitted flush with the edges of the front and back.

The framework of the inner removable nest-box lid is made from 1½-inch furring strips by nailing two pieces 9¼ inches long at right angles to two other pieces 11½ inches long. The two shorter pieces extend 1¼ inches beyond one of the 11½-inch crosspieces. This is covered with hexagonal 1-inch wire mesh. The projecting ends rest under a 1¼-inch strip the length of the box, thus eliminating the

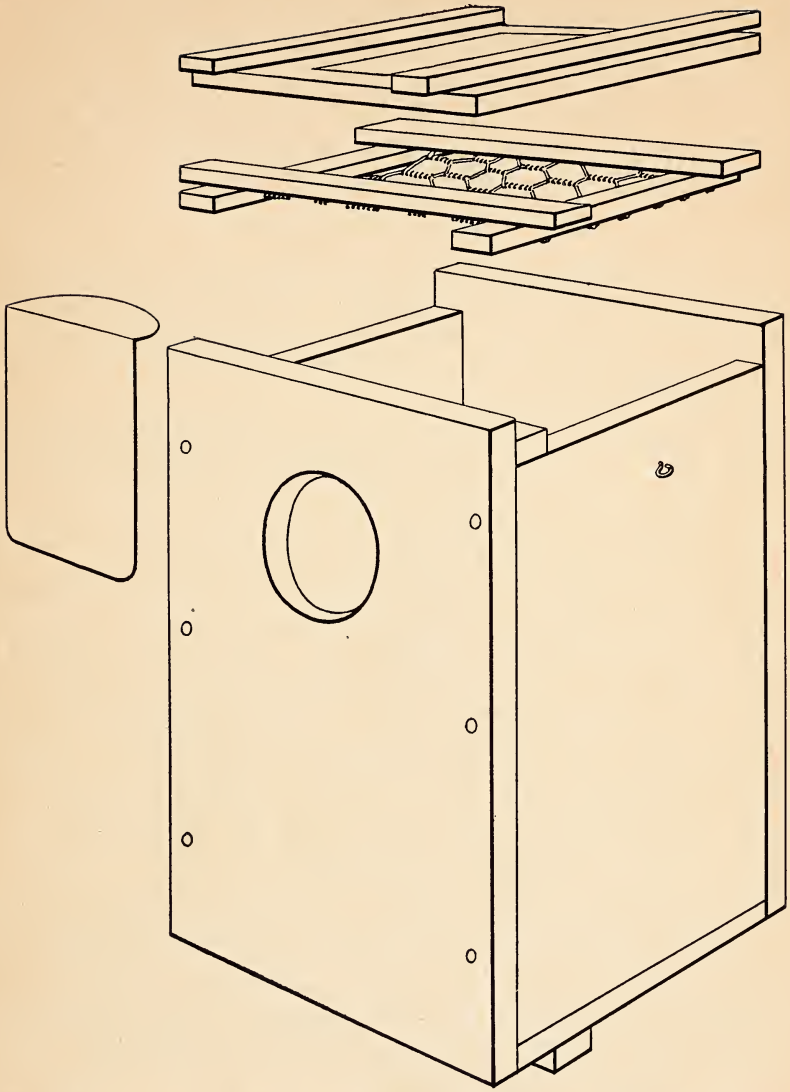

FIGURE 5.—Front (at left) and top views of mink nest box used in colony house.

necessity of hinges. A removable 8-penny nail inserted from the back of the nest box into the back crosspiece of the inner nest-box lid holds it securely in place and eliminates the expense of door catches and hinges.

The nest-box cover is designed primarily to insure privacy during the whelping and suckling periods without interfering with the ventilation of the nest box. Two strips, 1 inch wide and 11½ inches long across each end, permit the cover to rest flush with the top surfaces of

the front and back, and form a ¾-inch opening above the top of the sides through which warm, moist air from the nest box may escape.

Nest boxes rest on 1- by 2-inch furring strips nailed to the alleyway studding 4 inches above the sill. Two 3-inch hooks and eyes, one on each side of the nest box, near the top, assist in holding it firmly in place. A metal slide for confining the minks to the nest box when desired and a solid temporary floor for these elevated pens during the first 4 weeks after whelping should be provided.

Watering Dishes

Several different types of water cups are in use on mink ranches today. One of the simplest consists of a small porcelain or tin cup with a handle. The cup is held in place in one corner of the pen by a wooden peg which passes through the handle and the wire mesh of the side and end of the pen.

Another type of water dish consists of small, flat pans, approximately 6 inches long, 3 inches wide, and ¾-inch deep, fastened to the outside of the pen by small bolts, and having a ¾-inch wide trough extending into the pen. Such a pan will allow ample water for drinking but none for a bath.

Where the mink herd is not large, a home-made water fountain developed in earlier years at the Station is satisfactory for supplying adequate water which is clean and fresh, but still does not permit the mink to bathe (fig. 6). The porcelain cap inside an ordinary metal fruit jar cover is broken out and a hole approximately ¼-inch in diameter is punched in the cover top near one edge. A metal trough about 1 inch wide and ¾-inch deep, soldered tightly at each end, is fastened by solder to the top of the jar cover so that one end is flush with the edge of the cap, the other extends beyond the cap approximately 3 inches, and the ¼-inch hole is directly over the trough. Care must be taken that the trough is soldered paralled to the top of the cap so the end from which the mink will drink is not lower than the hole in the cap, which would cause leakage.

The cover with attached trough is screwed onto a quart fruit jar which has been filled with water, the jar is inverted, and held in place by a wire loop which slips over the end of the jar and is fastened at each end to the wire netting of the pen. Such a water fountain will probably need to be filled every other day for adults, and every third or fourth day for young weaned kits, except when the weather is very hot, when more frequent attention is necessary. This type of water container should be cleaned regularly to remove dirt and algae. It is not suitable during freezing weather.

A home-made water dish, large enough to allow ample water for drinking but too narrow to allow the mink to bathe, can be made from 28-gage sheet metal, 7¼ inches wide and 8¾ inches long (fig. 7).

Measure in ½ inch at the center of each end and draw lines from that point to each of the nearest corners. Cut out the resulting triangular pieces. Next, measure down on the sides 1 inch from each of the four corners, and draw a line from that point to a point ¼ inch from the corner on the end. Cut off these four small triangular pieces. Punch two holes on one side 2 inches from each end and ½ inch from the edge, and one hole midway from the ends and

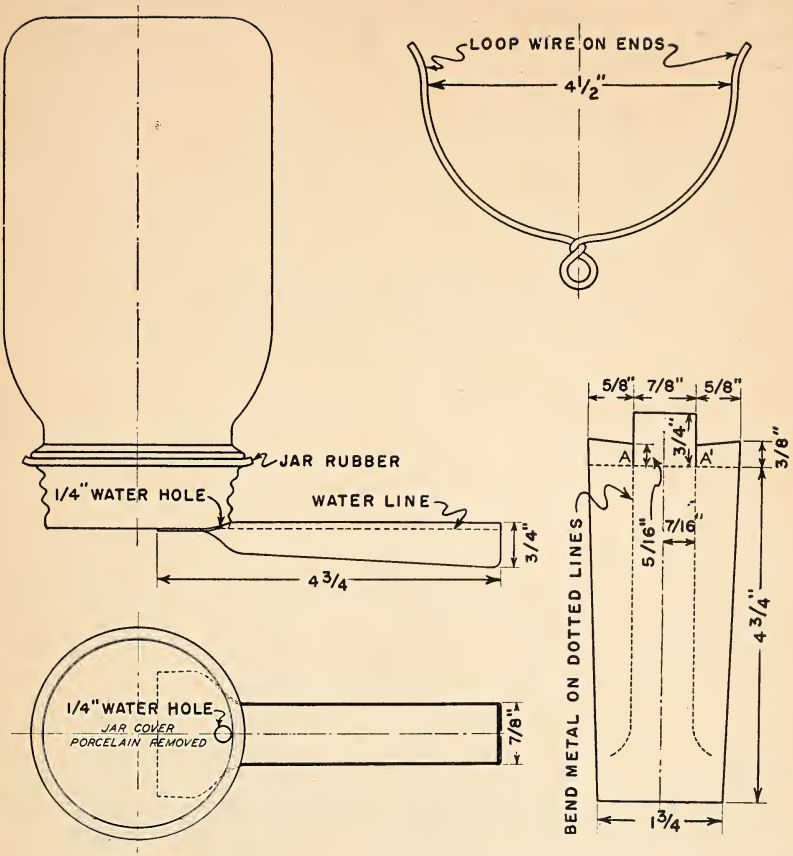

FIGURE 6.—Construction details of a water fountain made from a fruit jar.

in from the edge ½ inch on the other side. Bend the metal lengthwise in the middle so that the two sides are 1½ inches apart, and double crimp the ends together.

The water dish can be hung on the end of the pen by hog rings. A short piece of wire fastened to the hole on the front of the dish, and extending outside the pen can be used to dump the dish whenever necessary.

WATERING SYSTEM FOR LARGE RANCHES

Where a large number of mink must be cared for and water pressure is available, a system of watering that will save labor is extremely important. Such a system, planned and developed on a large mink ranch in Vermont, has been adapted to the station needs (fig. 8) in a colony-type house. It is comparatively easy to install. A ¾-inch pipe is attached near the end of the pens at the top by pipe straps or wire and is screwed tightly into the outlet opening. It is then unscrewed one-half turn.

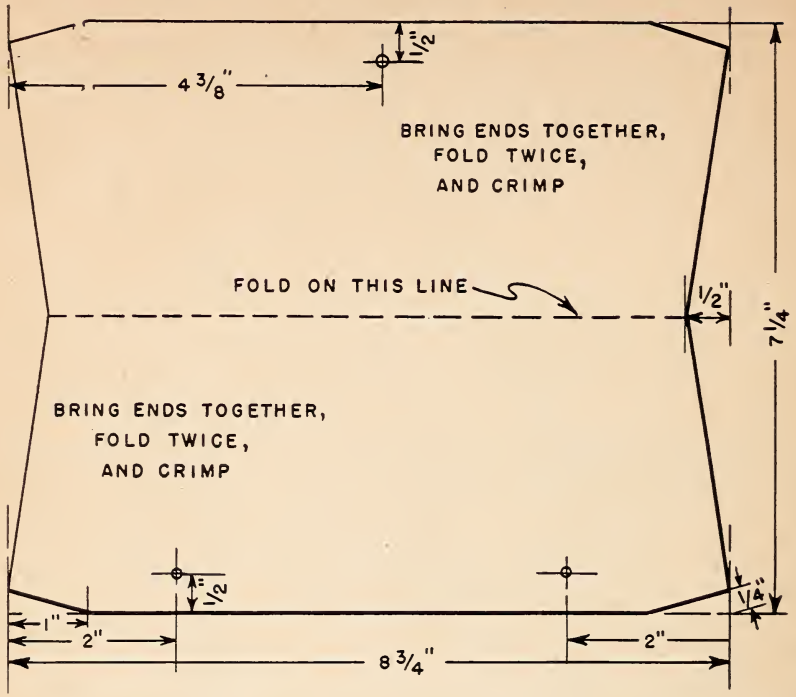

FIGURE 7.—Construction details of envelope type of water dish.

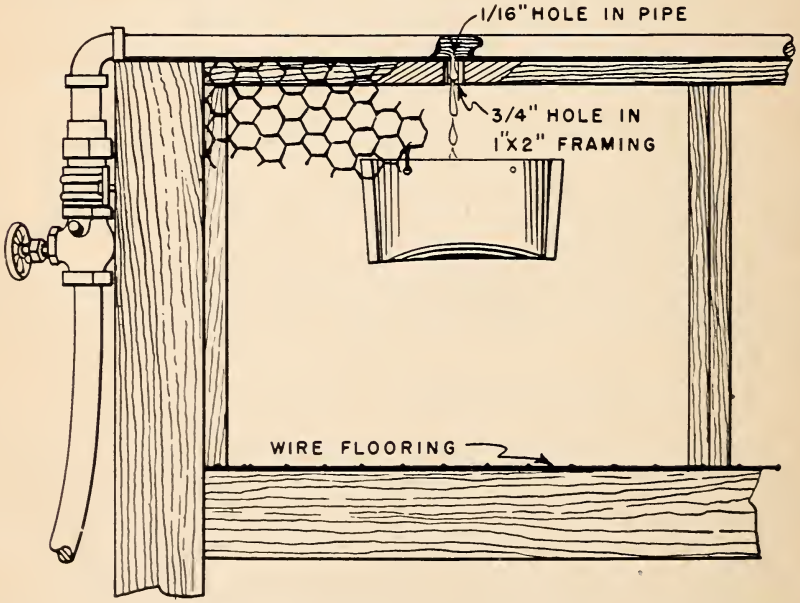

FIGURE 8.—Details of water system for colony house. Pan at top of cage is filled from hole in water pipe.

Holes are drilled in the pipe line the entire length about the middle of each pen, the openings being 1/16 inch in diameter in that third of the pipeline closest to the outlet, 3/32 inch for the middle portion, and 1/8 inch for the third that is farthest away from the water supply. These graduated sizes facilitate the proper distribution of the water. The pipe is then tightened so that the water will be directed through 3/4-inch holes in the 1- by 2-inch furring strip bracing the front of the pens into the container hung on the end of the pen. It is advisable to have such water lines no more than 100 to 200 feet long, because in such a case the water dishes closest to the water supply will overflow before the running water has reached those containers at the far end of the line. An underground shut-off valve, which also allows drainage of all unused water from the line, permits this system to be used in all but the most severe weather.

Mink Catching Box

A catching box in which the mink can be moved from one pen to another or in which the mink can be examined closely is a necessity

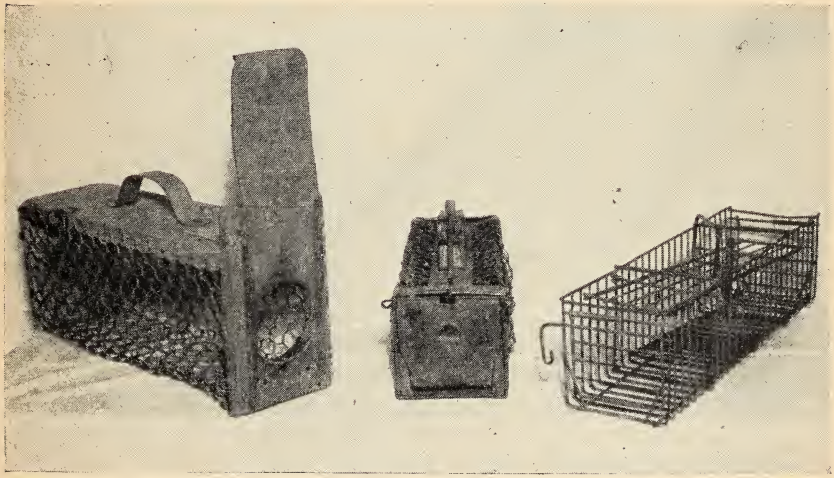

FIGURE 9.—Three types of mink catching boxes. The one at left is home-made.

on every mink ranch. Catching boxes of several different types are used successfully.

Three of the types in use at the station are shown in figure 9. The cage at the center is approximately 15 inches long and 5 inches square, has an attached handle, and a thumb lever by which the self-closing door can be opened.

The catching cage at the right is 18 inches long and 4½ inches square, with both ends hinged. A movable top allows the mink to be squeezed tightly against the bottom if close examination is desired.

A home-made catching cage 5 by 15 inches is satisfactory for handling mink. The front, back, and top, which may be cut from scrap lumber, are nailed together, and 3/4- by 1-inch wire mesh is used for

the bottom and sides. The opening in the front of the cage is 3½ inches in diameter, but may be larger if necessary. Metal strips guide the sheet metal in opening and closing the cage.

Shipping Crates

The mink shipping crate should be light in weight yet sufficiently strong to confine the animal and to withstand rough use in shipping. Attractive, uniform, and neat crates are a very effective advertising medium. They are usually constructed to accommodate one, two, or three animals. The single cage should be 10 inches square and 20 inches long and can be made out of ½-inch plywood. Half of the crate should be of solid wood construction to provide a retreat for the mink while in transit. The ends of the solid part have entrances cut in them. The floor end and top of the open half of the crate is covered with hardware cloth. Before the wire is completely stapled to the top, a small can or cup to serve as water dish should be attached to the wire end of the crate by hog rings.

Pieces of sheet metal 1 by 4 inches with the edges bent over to form grooves are nailed on both sides and below the entrance opening. A small nail driven through the top of the metal slide into the back prevents removal of the slide and escape of the mink.

The two- and three-compartment shipping cages are constructed much like the single crate, except that the top, bottom, and back are 10 inches longer for each additional mink to be shipped.

Guard Fence

A properly constructed guard fence surrounding the entire unit can pay for itself in a relatively short time by preventing the loss of any mink that might accidentally escape from its pen. It can also eliminate losses and accidents due to predatory animals. Such a fence should be about 5 feet high, with strong corner, gate, and line posts of durable, long-lasting wood. Posts should be 7 or 7½ feet long, depending upon whether set 2 or 2½ feet in the ground. Brace posts should be set 12 or 10 feet from the corners and gates, respectively, whereas line posts may be placed at 10-foot intervals. Spruce, pine, or hemlock 4 by 4 inches are satisfactory for use as braces. All post tops should be sawed to the same height and at a slight angle so that water or melting snow will run off quickly.

Two 2- by 4-inch pieces, one at the top of the posts and the other about 14 inches lower and fitting flush with the inside face of the posts, form the framework, hold the posts rigidly in place, and furnish a nailing surface for galvanized sheet metal and the top of the wire mesh.

Hexagonal 16-gage, 1-inch wire mesh, 5 feet wide, which has been galvanized after weaving, 1-inch mesh welded wire, or 1-inch mesh chain link fencing, depending on cost and availability, should be nailed to the inside of each post and to the lower of the two 2- by 4-inch pieces. About 4 feet of this mesh will form the wall wire of the guard fence while the remainder, bent at right angles to the posts and extending slightly below the surface of the ground, forms the carpet in the inside. Dirt and small stones placed on the carpet hold it firmly in

the ground and make the pen escapeproof. The guard fence may be constructed of 1-inch mesh, 4 feet high, with an 18-inch carpet of the same material. The carpet wire may be attached to the wall by means of hog rings.

A 14-inch sheet of 28-gage, galvanized sheet metal should be nailed to both the 2- by 4-inch pieces, thus presenting a smooth surface to any mink attempting to escape. Some guard fences are provided with a galvanized sheet metal overhang on the inside and at about a 60° angle.

Cold-Storage Facilities

It is important that some provision be made on the farm for holding fresh meat and for storing frozen meat, fish, and packing-house by-products. The extent of these facilities will depend upon closeness to commercial freezing plants equipped to handle such feeds, size of fur-farming operations, proximity to cooperative fur-animal feed-distributing routes, and similar circumstances. An electric freezer unit of 20 to 30 cubic-feet capacity may be advisable for a beginner. The larger units permit meat to be purchased in greater quantities and held until needed. If a walk-in type is to be built, refrigeration engineers should be consulted.

It is recommended that zero temperature be maintained if frozen food is to be held for long periods of time. Rapid freezing is desirable. The feed should be so stored that the pieces held longest can be fed first.

The literature on freezer units and quick-freezing meat should be fully consulted.

FEEDS AND FEEDING

A large number of diets of varying ingredients and percentage composition have proved entirely satisfactory for the feeding of mink. The fact that many ranchers feed diets differing so widely in composition is proof that the mink can utilize a wide range of nutritive ingredients. Those products which are economical and easy to obtain, and are satisfactorily utilized by the mink, should be used to the greatest extent possible in making up the ration. Table 1 gives a number of suggested rations.

As minks are carnivorous animals, the major part of the ration should be made up of muscle meat and various organs of horses, cattle, or sheep, and of fish. The local butcher frequently has byproducts not in demand for human food. Some of these are lungs, tripe, spleens, udders, livers, gullets, kidneys, and hearts. Regardless of the kind of meat, care should be taken to avoid use of any meat contaminated through careless handling. There is competition for this feed by dog-food manufacturers. Horse meat is commonly used because it is cheap. Occasionally useless horses may be purchased direct from nearby farmers. During fall the animals are more abundant. However, horses or other animals that have died for any cause, known or unknown, should never be used unless under the most exceptional circumstances, and then only on a trial basis with a few minks. Animals suffering from generalized blood-stream infections, fistula, poll evil,

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and running pus infections should not even be considered as possible sources of mink food.

In order to avoid the task of slaughtering, meat and byproducts may be purchased from other mink ranchers or cooperative associations.

Most mink ranchers follow the practice of cutting meat into chunks which are then put through a meat-and-bone chopper. The resulting hash contains some bone splinters and stringy tendinous material, so the entire hashed material is run through a meat grinder into pans

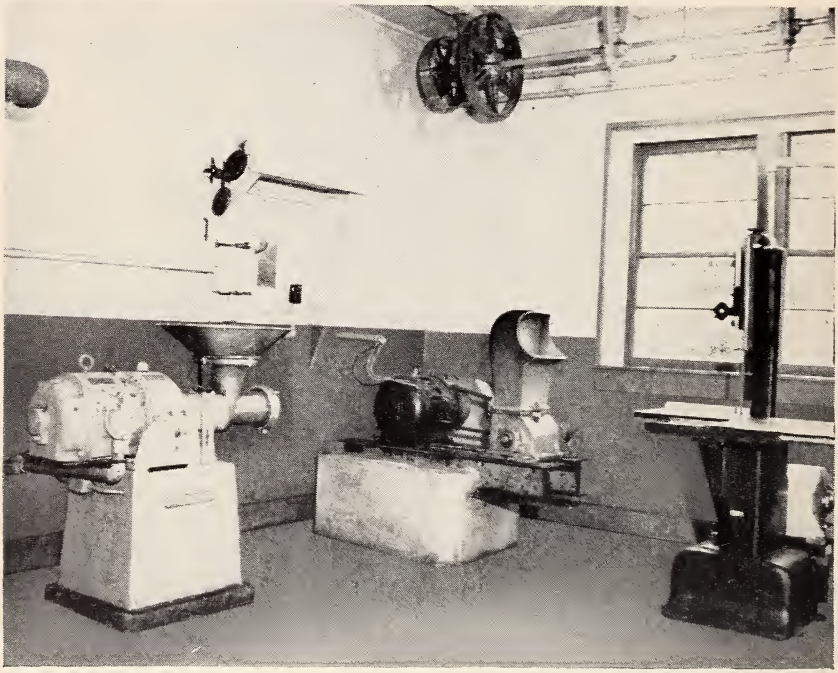

FIGURE 10.—Conveniently arranged equipment for processing meats. A band saw is shown at extreme right, large meat-and-bone chopper at center, and meat grinder at left.

and then frozen (fig. 10). Recently meat and bone choppers have been developed which handle a quarter of a carcass at a time. In some cases the equipment also consists of elevator conveyors which carry the hashed meat and bone directly to the meat grinder with a resulting significant saving in labor.

The cheaper fish, and also the trimmings from filleting, are widely used in feeding mink. Smelt, herring, carp, sucker, cod, haddock, flounder, and buffalo fish are the kinds most commonly used. The price is usually the determining factor in the kind to be fed.

If fresh-water fish, particularly suckers, smelt, buffalo fish, carp, and red horse are used in the mink diet, it is advisable to cook them under pressure for at least 20 minutes before using. Such action destroys enzymes present in the fish viscera which in turn destroy any

vitamin B_1 that may be present in the other ingredients. Without adequate vitamin B_1, mink soon develop deficiency symptoms, become paralyzed, and die. Another method by which a vitamin B_1 deficiency can be avoided, even though raw fresh-water fish are fed, is to use the fish in the diet one day, and meat and liver the next.

Poultry waste makes good mink feed but under no circumstances should any be used from birds treated with hormones to produce caponettes. Poultry waste should be fresh and handled in a sanitary manner and should be kept under zero or lower temperatures. See table 1 for recommended percentages.

Though minks are meat eaters, their rations should include some cereal grains (see list of dry mixtures, p. 20). If purchased separately for home mixing, these may include stale bread and cake, bread crumbs, waste products from manufacture of cereals for human consumption, oatmeal, or cereal grains processed especially for dog or fur-animal feed. Desiccated meat products such as beef meal and tankage, and fish meal, soybean meal, linseed meal, and similar products are used in mink feeds as partial substitutes for meat. This reduces production costs. Many feed companies now make a prepared meal for minks to be added to the raw meat and fish part of the ration. These prepared feeds are advertised as containing the vitamins and minerals required by fur animals. The home-mixed ration should contain such vegetables as lettuce, carrots, and tomatoes. Vitamin concentrates are advisable, particularly during the breeding season.

TABLE 1.—*Suggested rations for mink*

Ingredient	Ration 1	Ration 2	Ration 3	Ration 4
	Pounds	*Pounds*	*Pounds*	*Pounds*
Horsemeat	17. 0	25. 0	15. 0	10. 0
Fresh or frozen liver	———	10. 0	5. 0	5. 0
Blood	———	5. 0	5. 0	———
Lungs, tripe, udders, ocean fish, chicken heads, canned fish, canned chicken waste	[1] 37. 3	[2] 10. 0	[2] 15. 0	[2] 10. 0
Dry mixture	[3] 10. 3	[4] 20. 0	[4] 25. 0	[4] 25. 0
Tomatoes, carrots, apples, lawn clippings, vegetables	3. 4	5. 0	5. 0	10. 0
Steamed bonemeal	0. 3	1. 0	1. 0	1. 0
Fortified codliver oil	0. 2	0. 4	0. 4	0. 4
Beefmeal, fishmeal, corn-gluten meal, cottonseed meal, or peanut meal	———	———	———	6. 0
Water or skim milk	31. 5	23. 6	28. 6	32. 6
Total	100. 0	100. 0	100. 0	100. 0

[1] Consists of tripe, 22.1 pounds, chicken heads, 6.2 pounds; canned chicken waste, 3.5 pounds; lungs, 3.4 pounds; and fish racks, 2.1 pounds.

[2] May consist of any one or all of the ingredients listed, to be selected with regard to economy and availability.

[3] Made up of commercial cereal, 8.3 pounds; brewer's yeast, 1 pound; liver *A*, 0.7 pound, and powdered milk 0.3 pound.

[4] May consist of commercial feeds or a home-prepared mixture. See suggested mixtures, page 20.

Ration No. 1 is fed during the summer, fall, and early winter on a large mink ranch in New York State.

Ration No. 2 is recommended for adult mink January 1 to July 1, and mink kits from weaning to September 15.

Ration No. 3 is recommended for adult mink July 1 to pelting, and mink kits from September 15 to pelting.

Ration No. 4 is a sample of "low meat" ration fed to experimental kits and adults during summer, fall, and early winter for several years at Saratoga Springs, N. Y.

Suitable dry mixtures are as follows:

Ingredient:	*Dry-mixture No.—*		
	1	*2*	*3*
	Pounds	*Pounds*	*Pounds*
Breadmeal, cornflake waste, rice crispies, cookie crumbs, shredded-wheat waste	150	200	150
Oatmeal	150		150
Wheat-germ meal	50	50	50
Vacuum-dried fishmeal	100	50	25
Inactive yeast		75	25
Alfalfa leafmeal	50	50	
Skim milk powder		50	
Corn-oil cake meal		100	
Soybean meal			50
Beefmeal			50
Total	500	575	500

Feeding Schedule

An adult mink will consume from 5 to 9 ounces of food per day, depending upon the season of the year, the sex of the animal, the composition of the diet, and the individual needs of the animal. It is desirable at all times to keep the animals in a thrifty but not overly fat condition. There is a strong tendency among ranchers to overfeed, particularly during the breeding and gestation periods, with the result that many females become sluggish, inactive, very fat, and fail to raise their young. Females just slightly on the hungry side should whelp normally and produce an average number of young.

Many mink farmers feed mature animals only once daily during late summer, fall, and early winter. This system saves labor. When possible, however, it is desirable to feed twice daily—once in the early morning, and again in the late afternoon. Such a practice prevents excessive drying out of the food in the hot days of summer, and long periods without food in the winter, when allotted food becomes frozen and unavailable to the mink. In addition, feeding twice daily means fresh, palatable food, and fewer flies. Approximately one-third of the total daily food allotment should be given each mink at the morning feeding and two-thirds at night, so that the entire amount will have been consumed an hour or so before the next meal is due. The mink rancher should keep his animals active, interested, and waiting for the next meal. They should be hungry but not so much so that they dash frantically back and forth in the pen. This means that the feeder must regard every animal as an individual.

Adult females should be fed ration No. 2 or one similar to it from January 1 to the time that their young are weaned in late June or mid-July. The weaned young should be continued on the same diet until

mid-September or early October. After the young are weaned it is advisable to change the adults over to rations 3 or 4, or to one similar in composition to them. At this time the adults are entering the resting or maintenance stage of the reproductive and fur-growing cycles, and their nutritional needs are lower than at other stages of their life cycle.

Weaned mink kits can likewise be changed over to rations 3 or 4 after they are 4 months of age and have completed the period of most rapid growth. It is very desirable to provide adequate feed for necessary growth of both male and female kits so that they will be sexually mature in ample time for their first breeding season. Once growth and early maturity have been reached, do not continue such heavy feeding, or the animal will become excessively fat and unfit for use in the breeding herd.

Summer Feeding of Adults

After the breeding season, the mink males can be changed from ration 2 to ration 3. Nonpregnant females and those with destroyed litters can likewise be changed to the same diet as soon as it is apparent they will produce no young. All other females should be continued on the suckling ration (No. 2) until the young are weaned, at which time the mothers can be switched to the summer maintenance diet.

All animals, both males and females, should be fed as individuals, and given just enough feed twice (or only once) daily to keep them slightly hungry.

PRINCIPLES OF BREEDING

A knowledge of livestock breeding and genetics is especially important for mink breeders who are raising mutations. The following discussion is not based upon direct study of the various mutations of minks but is rather a brief review of the processes of inheritance and of some literature on fur animal mutations. A knowledge of these fundamental processes should clarify some of the misconceptions that are developing among fur-animal breeders and also provide a basis for sounder operations.

Fur farmers should not harbor the idea that once the intricacies of a genetic formula are solved all breeding operations henceforth will be simple, specific, and profitable. Although a thorough study of genetics is now considered advisable, the early improvement of livestock was accomplished by men having no knowledge of genetics. They had detailed knowledge of pedigrees, a remarkable memory of results obtained from certain matings, and had an almost uncanny ability to select animals that would "nick" to produce better animals.

Germ Cell Formation

There are, in the animal body, two general types of cells—body cells and germ cells. Microscopic studies have disclosed that both body cells and germ cells are alike in that the number of chromosomes in the cell nucleus is specific for each species. Chromosomes are bodies which stain heavily in organic dyes. For the mink the chromosome

number in each body cell is 28, or 14 pairs. The chromosomes constituting a common pair are identical in shape and length (except possibly the sex determining chromosomes) but the members of different pairs usually differ from each other in shape and length. The specialized cells of the body from which germ cells arise have the full quota of paired chromosomes but, in the process of developing into gametes (eggs and sperm) the chromosome number is reduced to one-half by the separation from each other of the members of each pair. Thus each egg or sperm capable of functioning in fertilization has only half the number of chromosomes present in the ordinary cells of the body, namely one representative of each chromosome pair. The accompanying chart (fig. 11) illustrates the process in maturing sperms and eggs in a species having only two pairs of chromosomes. The two pairs of chromosomes have been built back into the fertilized egg but the particular combination of pairs is different from that of either parent. Chance again is the controlling influence as to which sperm fertilizes the mature egg; it might be any one of the four.

Sperm and Egg Differences

There are certain differences in physical characteristics and development between the sperms and the eggs of mammals. Sperms are produced in the millions, are relatively small, are of characteristic shape, and are motile—they can propel themselves. The eggs are few in number (1 to possibly 20 at each ovulation), much larger than the sperms, round in shape, and nonmotile. The reduction of the chromosome number is the same in the formation of the egg as in that of the sperm but three nonfunctional eggs or polar bodies are formed in developing each mature egg. Which chromosomes are retained in the functional egg is again a matter of chance. The relatively larger size of the egg as compared to the sperm is due to the inclusion in it of food material essential to the nourishment of the embryo until attachment can be made to the maternal organs for further development. Nature has conserved this food supply by preventing it from being lost in the polar bodies or abortive eggs. Regardless of the difference in size of the germ cells of sire and dam, their relative potential influence on the offspring is substantially the same. The chromosomes alone are the bridges for inheritance. It is true that in actual practice the male seems to be more important, but this is due primarily to the fact that he is a more carefully selected individual and is used polygamously.

Size of Litters

The size of the immediate litter is determined by the number of eggs ovulated, properly fertilized, and satisfactorily nourished until whelping time. The male does not normally influence the size of the immediate litter since he furnishes sperms in countless millions. Yet under exceptional conditions he may do so. For example, the male may carry a recessive lethal gene. If the egg also carries the same lethal gene, then every fertilized egg which has received the lethal from both parents will fail to develop and so litters of reduced size

will result. The gene for the Silver Sable (Blufrost) mink is probably a lethal of this sort, viable only when present once in the fertilized egg, i. e., in heterozygotes. The male, however, transmits the tendency toward prolificacy to his progeny, and therefore it is desirable that he himself be from a large litter.

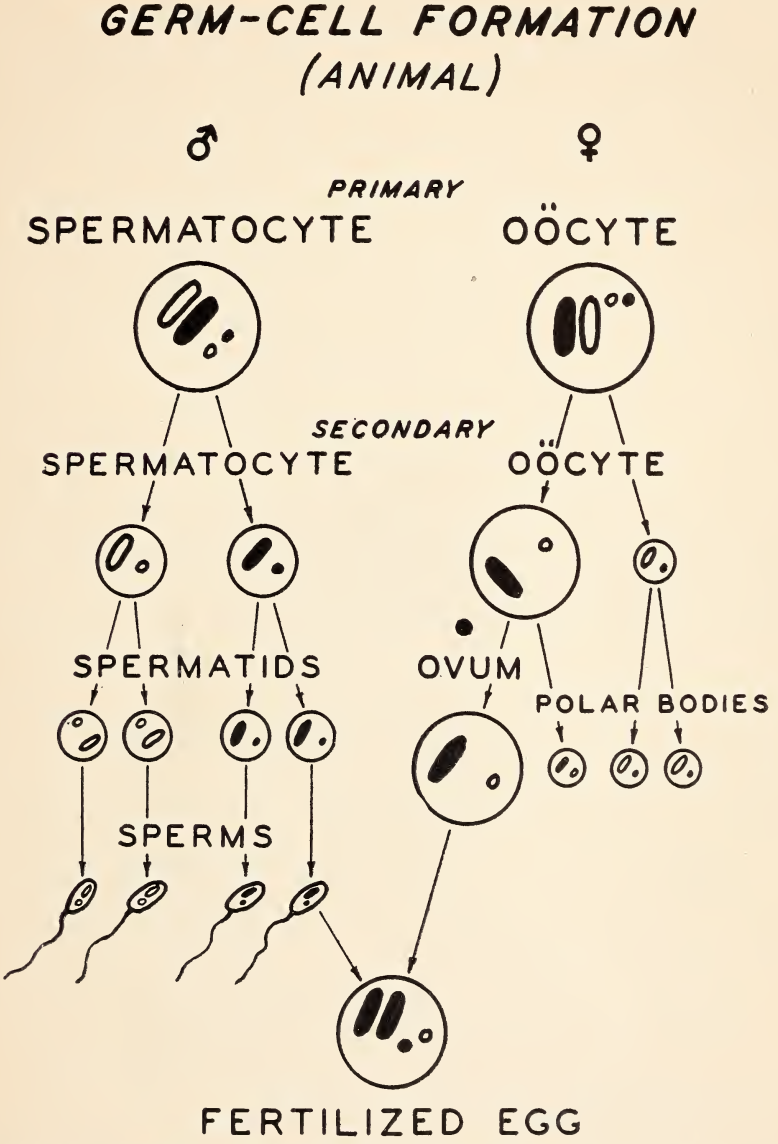

FIGURE 11.—Diagrammatic sketch of the formation of germ cells of an animal species having only two pairs of chromosomes and the resulting fertilized egg. Note new pairing of large chromosome.

Mendel's Law

Mendel's law states that (1) independent unit characters (2) showing dominance or recessiveness (3) segregate in the second hybrid (F_2) generation in definite ratios. If only 1 character is being considered, this ratio is 3 dominant appearing individuals to 1 recessive appearing individual. If 2 characters are followed at the same time, the ratio is 9:3:3:1—9 carrying both dominant characteristics, 3 showing one of the dominant characters and one of the recessive, 3 showing the other dominant and other recessive, and 1 individual showing both recessive characters. If 3 characters are being considered at the same time the ratio becomes 27:9:9:9:3:3:3:1 in the second hybrid (F_2) generation. It is at once apparent that practical breeding operations should be restricted to the fixation of 1 character at a time even if ultimately a combination of 2 characters is desired. The fixation of 1 character at a time requires much fewer theoretical numbers of progeny, or 4, as compared to 16 if 2 characters are to be established, or 64 with 3 characters. Because of the element of chance, actually more progeny may have to be produced to recover the 1 recessive. Even in flipping a coin, heads may appear 5 or more times in succession. The average litter size of minks is about 4.

In figuring simple Mendelian ratios, it is customary to use a capital letter (A or B or any other) to illustrate the dominant gene and a small letter (a or b) for the recessive gene. If the inheritance is of a single simple Mendelian nature, it will be as in figure 12 in which the individuals are designated by rectangles containing the doubled-up condition of the chromosomes carrying the particular genes and the different kinds of germ cells by circles containing the reduced number of chromosomes carrying the particular genes.

Minks of known genetic make-up, as far as specific unit genes are concerned, will produce progeny in the indicated proportions and of the genetic structure shown in figures 12 or 13. The reverse also is true— if the proportions (on sufficiently large numbers of progeny) for certain matings are as listed, the genetic structure of the parents may be inferred in accordance with the diagrams. The inheritance of any particular unit character may be followed in any definite kind of mating by merely substituting the name of the dominant character for the capital letter and its particular recessive for the small letter. The relationship to a particular gene of any of the other recessive or dominant genes can be determined only by actual test breeding. Also the interaction of different genes when in combination can be ascertained only by experiment.

The best way to test whether a certain individual is, with regard to a particular character, a hybrid or a pure dominant, is to mate the animal back to the pure recessive. If the animal being tested is a hybrid, 50 percent of the progeny will show the dominant character and 50 percent the recessive. If the animal is a pure dominant, all the progeny will show the dominant character.

All animals showing a recessive characteristic are pure-breeding for that character since they are homozygous for that characteristic because there is nothing in the genetic make-up to dominate it. The fact that any recessive and its dominant have been associated in the

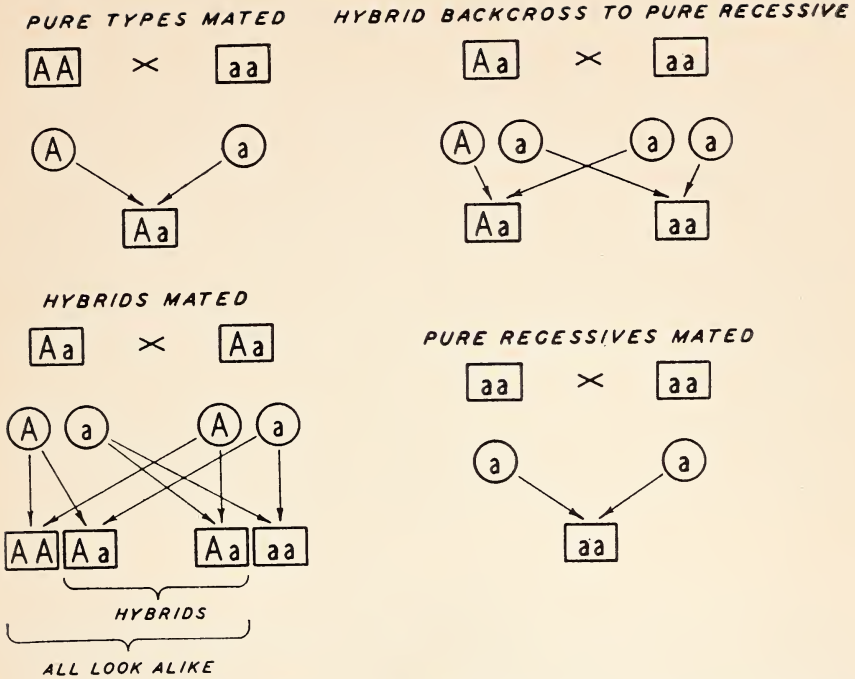

FIGURE 12.—Mendelian results to be expected when individuals carrying a known single unit character are mated. The capital letters represent the dominant character and the small letter the recessive. All other inheritance has been disregarded. The rectangles indicate individuals having the paired chromosomes and the circles the types of germ cells produced by the respective individuals.

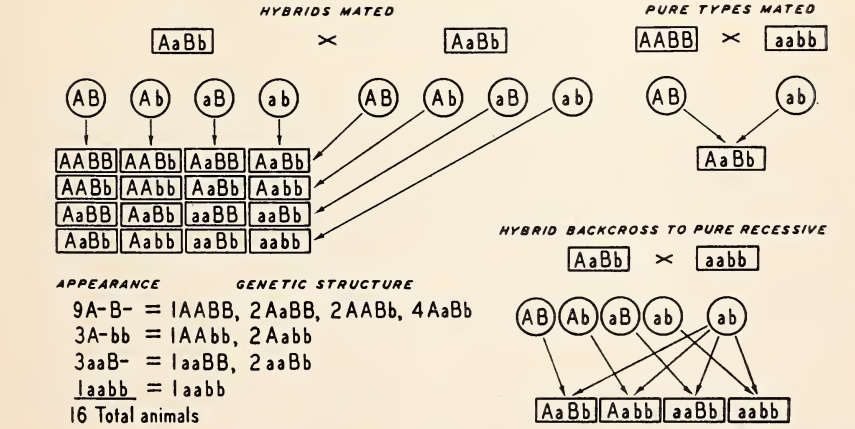

FIGURE 13.—Mendelian expectation considering two independent unit genes (a dihybrid). Note the symmetry of position within the box. Rectangles are individuals and circles are germ cells.

same individual in no way affects the possibility of its inheritance in later generations. In other words, if a Platinum (recessive) mink which produces Silverblu skin is recovered from hybrid browns, the brown will never reappear in the extracted Platinum strain, unless another mutation occurs (see exception under Multiple Factors).

Possibly, however, recessives recovered (Platinum mink) from the hybrids do not show the high quality of fur as did the best original stock (dark mink). This will result, not from contamination or modification of the recessive gene itself, but from the interaction with it of modifying genes introduced in the outcross. Conversely fur quality in a new mutant may often be improved by backcrossing to the original standard type (brown mink) in which a superior quality of fur has been established, if the superior quality has resulted from accumulation of desirable modifying factors.

When two unit factors are being considered at the same time, the complexity of the genetic types increased tremendously in the second hybrid generation, there being nine genotypes instead of three. In breeding a 2-factor hybrid back to the double recessive four genetic types in equal proportions are recovered (fig. 13).

Mendel's Law Expanded

The general principles of Mendel's law are as fundamental today as they were when first presented almost a century ago. Continued exhaustive studies during the past 40 years have reaffirmed the soundness of Mendel's law, explained many seeming contraditions that existed, and also projected some new principles.

Some of the more important modifications of Mendel's law of interest to fur farmers are discussed very briefly below. These new interpretations have been established after investigating thousands of generations of insects and small mammals that reproduce rapidly. They are not just speculations.

Linkage and Cross-Over

The chromosome explanation of composite inheritance states that each chromosome is made up of a series of genes arranged in linear order. As long as the choromosome functions as a unit the genes of that chromosome may be considered to be in a single package or as linked together. There may be then in the mink 14 independent groups of genes, since there are 14 chromosome pairs. Microscopic examination of germ cells at the time of their formation has disclosed the twisting about each other of members of the same chromosome pair. Breaks in the intertwisted pairs may result in interchange of parts between them, crossing over of genes from one chromosome to its paired mate. Actual breeding tests have revealed that genes originally located together in the same chromosome have become separated and one of them has been relocated in the paired chromosome. Thus it is demonstrated that cross-overs have occurred.

Dominance May Be Incomplete

Mendel's law suggests complete dominance over the recessive in the hybrids. A classical example of incomplete dominance is that of the blue Andalusian fowl. A black Andalusian chicken mated to a white Andalusian produces only blue chickens. These when mated together produce the customary Mendelian ratio of 1 black, 2 blues, and 1 white in which the hybrids are blue Andalusians. The blue Andalusian can never become a true breeding chicken because it is a hybrid—genetically speaking. From this self-evident type of incomplete dominance, the degree may vary until only an expert can distinguish the pure dominant individuals from the hybrids. Of course in some cases the dominance is apparently complete. Mink breeders can often readily distinguish animals which are hybrid browns (carrying the recessive factor for Platinum) from the pure standard brown ones (carrying both dominant characters). The sales of skins from these hybrids, as well as those from other hybrids carrying a single recessive factor, are frequently disappointing. Whether these hybrids should be used in further development of a particular color will depend upon circumstances, such as availability of desirable breeding animals of this color, and market demands.

Interaction of Factors

Certain factors or genes acting independently produce individuals different from those in which these particular factors or genes appear in conjunction with other factors. It is believed that, instead of a single gene affecting a single character exclusively, all genes have an influence in conjunction with each and every other gene to a greater or lesser degree in giving expression to certain characters. A combination of genes is absolutely essential to the production of some specific characters. Possibly this is a partial explanation of the color graduations found in "cross fox" skins.

Modifying Factors

Modifying factors also contribute their share to this complex picture. It is common knowledge among all fox men, for example, that by selective matings the "black" fox was changed to a pale silver without losing the recessive trait of "black" which occurred as a mutation from the red fox. These same series of modifying factors also may produce such gradations of white-marked and of platinum foxes that it is difficult if not impossible to distinguish some white-marked ones from some platinums. Modifying factors exist in minks and give the gradation in dark and platinum colors. Such factors, of course, also may operate in conjunction with factors other than those for color.

Multiple Factors

Somewhat similar results may be caused by "multiple factors" which affect a single characteristic. Such inheritance pertains usually to quantitative characters. These numerous factors located in different

chromosomes, or some even in the same chromosome, may have a cumulative effect which would intensify the appearance with each additional one. On the other hand they may be noncumulative. These are additional factors that do not change the appearance of the individual, but drastically change the expected ratios in subsequent generations. Multiple factors may have equal or unequal influence. A schematic diagram of multiple factors is shown in figure 14. There is as yet no known comparable situation in fur animals. In fact multiple factors would be difficult to follow in inheritance because of disturbance of the expected Mendelian ratio.

Among fur animals, there are reported cases of two different factors arising by separate mutation but both producing a similar appearing type (phenotype). The first of these discovered concerns the silvering in foxes (recessive). But when standard silvers are bred to Alaska silvers, "cross-foxes" result, which show a combination of the red and

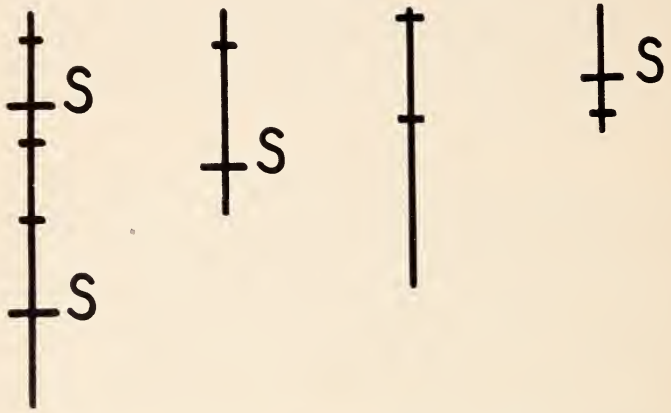

FIGURE 14.—Schematic drawing illustrating specific location of genes all affecting the characteristic "S". Two of them are "linked," that is, they are in the same chromosome. As these chromosomes are all of different lengths (not paired), the group may be representative of a germ cell.

silvering characteristics. The degree of uniformity in appearance of these "cross-foxes" is dependent largely upon the degree of close breeding back of the parent standards and back of the parent Alaskan stock. The genes for these two types of silvering are located in different chromosomes because there is a Mendelian dihybrid segregation. Silvers can be recovered by mating these "cross-foxes" together. Apparently the genetic relationship of the two genes is not as clear cut as that of a single two-factor condition. More study will be required to clarify all results.

A similar two-factor condition has occurred also in minks. Two different strains of mutation Platinum (recessive) minks when mated produce standard-color mink. The Platinum can be recovered by proper later matings.

A possible genetic explanation of these cases may be that the dominant alleles of both recessives are necessary in combination to produce the dominant appearing individual.

Multiple Allelomorphs

Multiple allelomorphs are the result of repeated mutations of an identical gene (fig. 15). Careful breeding tests have resulted in the identification of as many as 10 mutations of a single gene in some species. No more than any two such genes may be found in an individual, one in each of the paired chromosomes carrying this factor. It is self-evident, therefore, that any breeding operations to fix a particular type or combination of types dependent upon multiple alleles would be radically different from the procedure of establishing the same number of characters resulting from independent unit factors. With multiple allelomorphs any two would segregate in the same manner as a single unit ratio. The multiple-allelomorph theory has been proposed as an explanation of the genetic interrelationship in foxes of platinum, whiteface, and silvering in the foregoing order of dominance. Repeated careful test mating will be necessary before

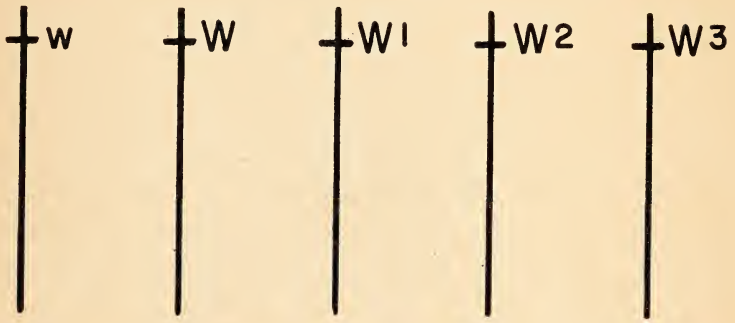

Figure 15.—Schematic drawing illustrating numerous mutations occurring at a particular position on a chromosome. These are homologous (similar) chromosomes. No more than two of them can occur in the same individual.

definite conclusions can be drawn. So much confusion exists as to exact descriptive distinctions between platinum and white marked foxes that careful research work will be difficult. Fox farmers themselves are frequently unable satisfactorily to determine by appearance whether a particular fox is a platinum or a white marked. Reference must be made to ancestry.

Lethal Factors

The discovery of lethal factors has clarified several of the seemingly unorthodox Mendelian ratios that have occurred. If the lethal factors occur in a homozygous condition (inheritance from both parents) the individual dies. This means that the number of young produced in the second generation will be one-quarter less than if the lethal condition did not occur. If the lethal factor behaves as a dominant character, a homozygous dominant can never be produced since all the dominant-appearing individuals growing to maturity would of necessity be hybrid and consequently would never breed true. Such a condition was found to exist in some herds of white-marked silver and in platinum foxes.

In other herds it has been reported that a certain strain of white-marked animals when mated repeatedly to silver foxes produce litters with 100 percent white-marked progeny. This would seem to be sufficient evidence that the homozygous white-marked fox can be produced.

A possible explanation of these apparent discrepancies may be that in one strain the mutant-lethal gene is in the same chromosome with the white-marked one and is so close to it that to all intents and purposes they are the same gene. No such lethal mutant may have occurred in the other strain of white-marked animals, thus permitting the homozygous whiteface to exist.

In the mink the black-cross is a dominant single unit factor. In practically all matings to standard-colored mink about 50 percent of the kits are black-cross and 50 percent standard color—the expected condition when a dominant hybrid is mated to a recessive. The argument has been presented that since the breeding results of the black-cross mink are similar to those of the white-marked fox; therefore, there must be a lethal factor in the black-cross mink. Mutations are expensive and the quickest way for a breeder to multiply his new dominant mutation stock is to breed the male to as many recessive standard females as possible. The result is nothing but hybrids not because of a lethal factor but because dominant animals have been mated to recessives. That this is the proper interpretation with black-cross mink is evidenced by the fact that a few homozygous black-cross individuals have been produced and have been test-mated to prove that they are such. Fortunately these homozygous individuals are white with only small patches of black on the head and the rump—a different looking animal from the usual black-cross mink. Had the homozygous individual looked like the hybrids (which is entirely possible) test matings of large numbers of individuals would have been necessary.

Variations

Variation is the hope and the despair of animal breeders. If there were no variation there would not be any chance of improvement. Undesirable variations occur along with the good. The successful rancher must sort and eliminate. Once a desirable trait has been obtained, great care must be exercised by the breeder to conduct his operations so that the good will not be lost.

Gene Mutation

From an inheritance standpoint fur farmers are primarily interested in germinal variations. The particular type that is receiving most attention is that of the gene mutation. The frequency of the occurrence of gene mutations varies with different species, but in general mutations of noticeable character are rather infrequent. They occur spontaneously: they cannot be forced.

Gene color mutations in minks have frequently occurred in mediocre animals. In retaining the mutation the undesirable characteristics must be carried along until they can be eliminated by selective matings. Any undesirable characteristics due to genes within the same chromo-

some as the desired mutation cannot be eliminated until the two are separated by means of a possible cross-over. If such undesirable characteristic is due to a gene close to the mutation gene it may be virtually impossible to expect a separation.

Recombination of Factors

The situations just mentioned form the basis for the statement that variations due to recombination of factors are of far greater importance to fur farmers than gene mutations themselves. These recombinations of factors are within the control of the fur-animal breeder. A knowledge of the processes of inheritance should assist in obtaining a maximum combination of desirable characters. The same applies to characteristics that are not dependent upon single known genes.

Mating

The mating season in the mink occurs principally during March. Eastern minks breed about 10 days earlier than Yukons. As the length of the day increases, the eggs in the ovary become progressively larger before they degenerate. The estrum, or heat period, occurs once a year, and lasts from 2 to 3 weeks. A good rancher can tell by the actions of the female when this period is approaching, which is about the first of March. Matings, however, should not be made until about March 10 in the latitude of Saratoga Springs, N. Y. Experience has shown that when either animal is not ready, many early matings will be unproductive. In minks the stimulus of copulation is necessary to cause the female to release the mature eggs from the ovary (ovulate), though occasionally fighting will cause ovulation. Even though copulation takes place, the eggs may not be well enough developed to be released, or if released the male may not have mature sperms. In the latter case pseudopregnancy may result, which lasts about as long as true pregnancy unless the female is rebred successfully. It is easier to obtain matings without the risk of fighting and injury if the season is well advanced. The chances of failure to conceive are thus reduced. Minks breed when about 10 months old.

The female mink can be caught in the nest box or in a special catching box and carried to the desired male. An aggressive male will pursue his mate and attempt service if she is in heat. If in heat she will not resist strongly, but if a fight ensues the pair should be separated and a retrial made later. A service may last 30 to 40 minutes or even longer. A number of ranchers in recent years have followed the practice of interrupting matings after 15 minutes. This conserves the male.

The first mating each season for each male should be checked for living sperms by a vaginal smear after the animals have separated. If no sperms are present, the female should be placed with another male. The follicles, in all probability, will have been stimulated by the first mating and every reasonable attempt to obtain another mating should be made. Since the eggs will not be released from the ovary for about 48 hours after the first copulation, sperms deposited as late as the day after should be effective.

Another attempt should be made the next day to breed a female that has copulated. This should insure that plenty of fresh sperms will be waiting for the eggs as they emerge from the ovary. The practice of breeding 4, 5, or 6 days after the first copulation is considered by some breeders to be time wasted, but recent work indicates that rebreeding more than 6 days after first mating is good practice because any females that were not impregnated by the first mating may become pregnant if 6 days or more elapse between first breeding and rebreeding. It may be wise to wait 6 days before rebreeding a female that has had a fight with a male. Some females will not breed again, but this is not proof that they are pregnant. Kits should not be mated with pugnacious older animals. It is advisable to try all the adult females at least once before starting with the kits.

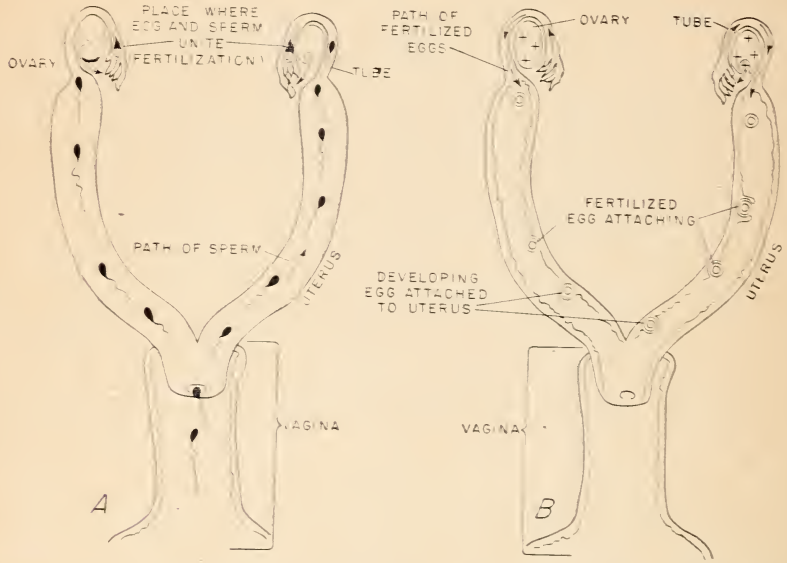

FIGURE 16.—*A*, Diagram showing the path of sperms from the vagina through the uterus to the upper ends of the tubes, where fertilization takes place, and also the spot from which the egg left the ovary. A single egg is shown in each tube, but sperms are shown along the entire tract. *B*, Diagram showing the path of eggs from the tubes, where they were fertilized, to the place of implantation in the uterus.

Sperms deposited in the vagina are forced up through the uterus by the muscular activity accompanying copulation, reaching the lower end of the tubes before the animals separate. The passage of the sperms through the tubes is not rapid, but the exact time required is not known. Those left in the vagina do not live more than a few hours, but those that arrive at the upper end of the tubes must live for 1 to 2 days, as the eggs may not be ready for fertilization until the end of the period.

Under ideal conditions, fresh sperms are waiting in the upper end of the tube for the eggs to be shed (fig. 16, *A*). One sperm enters and fuses with, or fertilizes, each egg, which otherwise would have had a very short life. The site from which the egg was discharged now

changes its function of egg formation to that of a body secreting a hormone that acts on the uterus.

The fertilized eggs now pass down the tube to the uterus. This passage probably takes several days, during which the hormone secreted by the spots on the ovary from which the eggs were discharged has been acting on the uterus. The action of the hormone makes the uterus ready for the fertilized eggs, which, on arrival, sink well into the velvetlike lining and become implanted (fig. 16, *B*).

Gestation Period

Young may be born 40 to 76 days after mating. The early mated minks have a longer gestation period than the late mated ones and thus the whelping dates are more closely grouped than the breeding dates. The mean length of gestation in mink is about 51 days. Special research studies have demonstrated that the embryonic attachment is for a period of only about 30 to 32 days, regardless of date of breeding. The fertlized eggs float freely during the early part of the gestation period.

Care of Young

The mewing of the kits, black tarry droppings, and the female being off feed for a day or so will indicate that whelping has occurred. From four to nine kits are usually born to a litter. Unless something unforeseen develops they should not be disturbed for a week or so, though the experience of the rancher and his knowledge of the individual animal should be the final deciding factor in the matter. The young minks grow rapidly and when they are about 3 weeks old will begin eating their mother's ration, which she carries to them. Continuous crying of the kits is an indication that they are hungry or cold and need immediate attention. The young minks will come out of the nest box when 4 or 5 weeks old. What has been called nursing anemia affects some of the producing females when the young are 4 or 5 weeks old. A satisfactory method of handling such animals is to remove the mother and give her a ration high in liver and red meat.

The young should also receive special feed and attention. They should be weaned when 7 or 8 weeks old, at which time the mother may be taken away some distance. A few days later, after the young have ceased to miss their mother, they can be placed in individual pens. Litter mates of one sex may be kept for a few weeks after weaning in the same pen if it is large enough. An average of four weaned minks for every adult female on the farm is good production. Some females, of course, do not breed, and others lose their litters.

HINTS ON MANAGEMENT

Keeping records is most important to good management in the minkery. Recorded information will assist in selecting breeders and in making the desired matings for improvement. Of particular importance are descriptions of density, color, and quality of fur, date and frequency of breeding, animal to which bred, date of whelping, size of litter whelped, distribution of sex, and number of young

weaned. Certain record sheets showing type and quantity of rations fed during reproduction, summer maintenance, growth, and fur-development periods will be valuable in making proper adjustments later and comparisons from year to year. Cards containing the desired information systematically arranged so that records can be completed merely by checking certain items will facilitate this tedious task. Mental notations may be forgotten or become confused.

Each mink should have a small brass identification tag with its number stamped thereon. This tag may be hung on a nail on the pen where the mink is confined, and should be moved whenever the mink is taken to another cage. There are numerous methods of numbering mink, one of the simplest being to indicate by a letter the year in which born, while the number indicates the sex and identification of the animal. Litters are numbered in units, i. e., 1 to 9, 10 to 19, 20 to 29, etc. Odd numbers are assigned to males; even numbers to females. If there are more than five males or females in the litter, reassign numbers, adding the letter X after the numeral assigned.

Nest boxes should always be kept dry by frequent changes of the fine absorbent bedding. The last cleaning of the nest box before whelping should not be later than 10 days before the expected date of whelping. Narrow mesh hardware cloth or a wooden floor should be placed in the pen at this time as a temporary floor to prevent any small mink from falling through to the ground. Additional bedding may be put into the pen near the nest box so the female may carry it in. The bedding should be changed more frequently as the kits grow older.

In hot weather the minks should be given fresh, cool water frequently and it may be necessary to hang wet cloths around the pen or even to wet down the ground or cement floor. The minks should not be unduly disturbed. Careful management, based upon a knowledge of the characteristics of individual animals, is necessary to the greatest success in mink raising.

Tail chewing frequently occurs on most mink farms. This may be caused by unbalanced ration, parasites, nervousness, undue excitement, or poor circulation of the blood.

Recent research conducted at Saratoga Springs has indicated the possibility of causing adult mink to assume their winter coat and be ready to pelt as early as September 3 by artificially altering the length of day and night to which the animals are exposed. Apparently the long days of spring stimulate the shedding of the old winter coat and the growth of the new summer pelage. The shorter days of late summer and fall stimulate the shedding of the summer coat and the growth of new winter fur.

Sufficient knowledge is not yet available to warrant this new management practice by the commercial mink rancher. When some of the more basic facts become known and a definite procedure can be set up which gives consistent results, the mink industry can in all probability profit handsomely from these findings.

SANITATION

Sanitation is essential for profitable mink raising because it aids in maintaining the health and well-being of the stock. Regular, fre-

quent, and thorough cleaning of pens and nest boxes is highly important in controlling insects and parasites. The use of a good disinfectant assists materially in controlling parasites and outbreaks or spread of disease. Clean feed rooms and feed dishes help prevent digestive disturbances. Precaution in all these matters will be highly profitable.

PELTING MINK

Some time during August animals to be pelted should be put into individual pens entirely protected from sunlight. Some of the more successful mink farmers have provided suitable furring pens by bending woven wire to form oblong enclosures somewhat smaller than the individual breeding pen, placing these on two logs to raise them about 6 to 8 inches off the ground, and then covering the entire row with tar paper (fig. 17). After pelting, the pens may be stacked and the premises cleaned and disinfected.

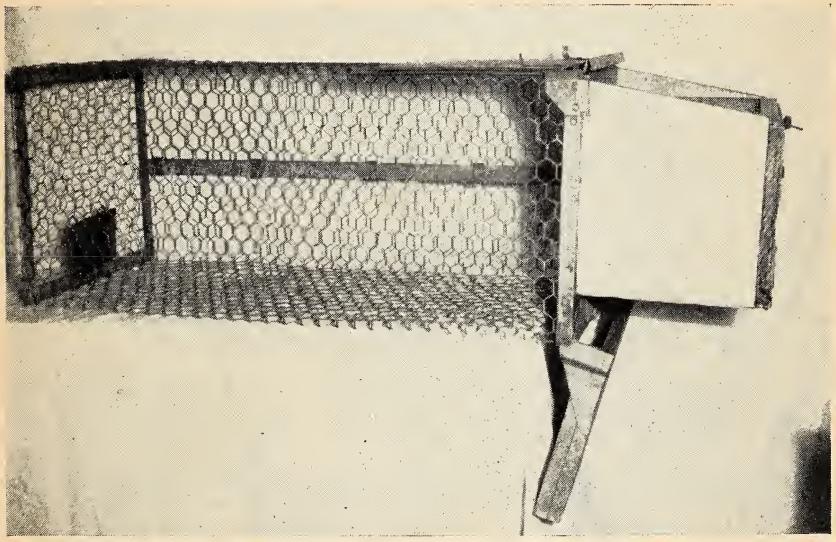

FIGURE 17.—Furring pen for a mink that is to be pelted.

It is considered desirable to reduce the percentage of muscle meat in the ration for animals to be pelted and substitute tripe and other non-glandular organs. The proportion of dry mixture should be increased.

The time of pelting varies with locality and season but is usually between November 15 and December 10. The fur then appears to be full of life, glossy and dense, and completely grown out. The condition of the pelt may be determined by catching the animal and blowing into the fur. The exposed skin when it still has a slightly bluish tint is considered to be ready for pelting. If creamy white the skin has gone beyond prime and the fur has lost some color.

Killing Animals To Be Pelted

There are several methods of killing mink but most of them are based on the principle of confinement in a small airtight box having a small hole through which some kind of lethal gas can be introduced. The gases commonly used include carbon monoxide from the exhaust of an automobile, calcium cyanide, chloroform, and carbon tetrachloride. If the gas from the exhaust of a car is used, care should be taken to keep the hot fumes from striking the animal and singeing the fur. An airtight box (fig. 18) having five or six narrow compartments, a ¾- by 1-inch mesh floor, individual entrances, and a removable metal pan beneath the floor on which to put cyanogas crystals has proved satisfactory for killing mink at the Saratoga Station.

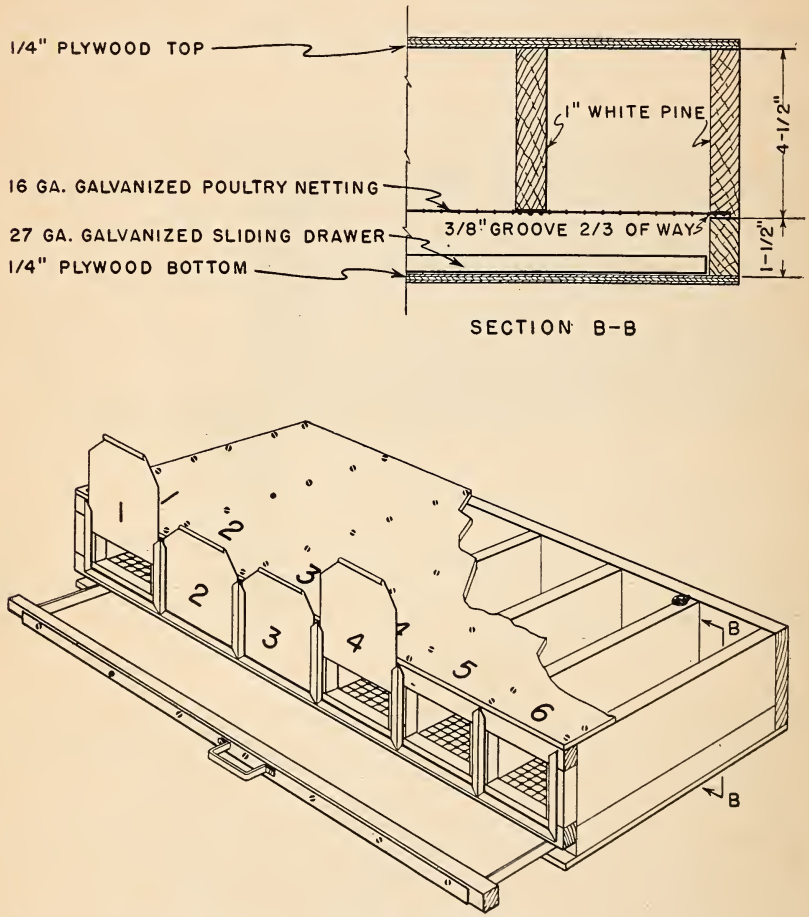

Figure 18.—Mink killing box with six compartments.

LIST OF MATERIALS FOR MINK KILLING BOX

2 pieces ¼-inch plywood, 14½ by 30 inches, for top and bottom.
1 board for back, ¾ by 6 by 30 inches.
2 pieces for sides, ¾ by 1½ by 13 inches.
7 boards for sides and partitions, ¾ by 4½ by 13 inches.
5 pieces for partition faces, ¾ by 1¼ by 3 inches.
2 pieces for side faces, ¾ by 1 by 3 inches.
1 piece for top strip, ¾ by 1⅛ by 30 inches.
1 piece for bottom strip, ¾ by 1 by 30 inches.
1 piece for drawer front, ¾ by ¾ by 30 inches.
12 pieces galvanized sheet iron—27 gage, 1 by 4¾, for vertical slots.
6 pieces sheet iron, 1 by 4 inches, horizontal slots.
6 sheet-iron door slides, 6 by 4⅝ inches.
1 sheet iron drawer, 30½ by 15¾ inches.
1 piece galvanized-wire netting, ¾ by 1-inch mesh, 16-gage, 13 by 30 inches.
1 drawer pull.
5 dozen flat-head wood screws, ¾ inch, No. 7.
1 dozen round-head wood screws, ¾ inch, No. 7.
½ pound 6d finishing nails.
⅛ pound ¾-inch barrel nails.
¼ pound ¾-inch poultry-netting staples.

After all pieces of lumber have been cut to dimensions, assemble the top, back, partitions, and the two 4½-inch sides. Place the box, top side down, and attach the wire mesh to the bottoms of the partitions and ends. Each end of the killing box consists of two pieces of wood, the upper piece being 4½ inches wide, and the bottom section 1½ inches. At the junction of the two pieces which form the sides, a groove ⅜ inch deep is cut on the inner surface of the 4½-inch piece. This groove provides a surface for stapling the wire mesh bottom to the sides. In this manner the outside contacts of the two pieces forming the side of the box remain airtight and do not allow the gas to escape. As soon as the wire mesh bottom is in place, attach the two remaining 1½-inch side pieces to the box and complete the front by nailing in place the top 1⅛-inch strip, the bottom 1-inch strip, the five 1¼- by 3-inch pieces used as faces for the partition, and the two 1-inch side faces. Metal guides are formed by bending 1-inch strips of 28-gage galvanized sheet metal at right angles along the midline. These guides are tacked, one strip on each side, and one on the bottom of each killing compartment. The bending is completed to make an airtight groove in which a tin slide can be inserted.

The sliding tray, which is constructed of a piece of 28-gage galvanized sheet metal, 30½ inches long and 15¾ inches wide, has all four edges doubled over to give added strength. The doubled piece of galvanized metal extends ¾ inch up the front side of the ¾- by ¾- by 30-inch piece of wood which forms the front of the drawer. It is attached to the wood piece by screws, thus giving added strength. An ordinary drawer handle is attached to the middle of the sliding tray. The final step is the attachment of the plywood bottom to the two sides and back. Both top and bottom are firmly fastened by ¾-inch No. 7 wood screws. If properly constructed, the killing box should be practically airtight when construction is completed.

A quicker and easier method of killing mink has recently been developed by mink ranchers. First, see that your hands are properly protected with gloves. Hold the mink in your left hand with its back

toward your body, your fingers across its chest and the thumb across its shoulders. Cup the right hand slightly, drawing it across the face of the mink so the nose fits in the cupped palm, then draw the head backwards almost to its shoulders. Next push the head forward and slightly upward with a quick stroke and at the same time twist the left hand slightly clockwise and move it toward your body. When properly managed the head will roll out of the neck socket and death is instantaneous.

It requires less time to kill a mink by this method than it takes to read this description.

Skinning

The mink is most easily skinned while the body is still warm, but some ranchers prefer to delay skinning about 1 hour until the fat hardens. A table of proper height equipped with devices to aid in holding the carcass should be used. Some commercial ranchers stretch the hind feet apart fairly tightly and slit the skin from the pad of one foot straight across to the pad of the other. Another long, diagonal cut is made on both sides from the under base of the tail to the original cut. Though this procedure leaves a small triangular-shaped piece of skin on the carcass, it exposes the fur at the base of the tail for convenience in making an examination, if the mink skins are to be sold with the fur side in. A slit is made from the pad up the back of the front leg about 1 inch. The skin is worked free from around all four legs and then cut loose from the carcass just above the feet. If mink scarfs are popular the paws should be skinned out, toe bones clipped close to the skin and left attached to the skin. A short slit is made along the under base of the tail so that, after freeing the skin from the top of the tail with the fingers, the bone can be pulled out with the assistance of a board or iron having a notch of the proper width. The carcass is then hung on a hook or nail by the tendon of the hock joint, and the pelt is pulled down, the knife being used whenever necessary to free it, until it is removed as far as the neck. Careful work is then necessary to cut around the base of the ears, leaving them on the pelt, around the eyes, and around the mouth and lips. The tail is finally slit on the under side along its entire length, the knife following a grooved guide made of metal, such as an umbrella stay. An identification tag should be attached to each skin by means of a string through an eyehole.

The pelt should be kept as free as possible from blood, grease, and dirt during these operations. All loose fat and flesh should be removed.

Fleshing and Drying

Before fleshing (scraping), some breeders put the pelt on a drying board and chill in a refrigerator or in a suitable utensil surrounded by ice and salt, or merely set the pelt aside overnight. Others hang the pelts by the nose in the refrigerator. The fat will be hardened and, therefore, will be much more easily removed and the pelt is less apt to be damaged in scraping. Pelts should be scraped from the rump towards the head, with the angle of the fibers rather than against. Frozen pelts should be completely thawed out before fleshing is started. Scraping

may be done with a special instrument purchased for this purpose, a dull knife, or even a large spoon, the skin having first been slipped over a stationary beam of the proper size and rounded on the top side, and set at the desired angle for satisfactory work. Scraping is a most important operation. Too close scraping exposes the roots of guard hairs and fur and causes them to come out. It is much better not to scrape enough than to overscrape. Full use should be made of clean, kiln-dried hardwood sawdust and of burlap material during the fleshing operations in order to prevent the fur from becoming greasy. The proper technique can be acquired best by experience, consulting successful breeders, and discussing this point with those who have previously used or handled some of the dressed pelts from your minks.

Mink raisers who produce a large number of skins prefer to clean them by means of a revolving drum containing hardwood sawdust. This is done first with the flesh side out and then again with the fur side out using fresh, clean sawdust. The clinging sawdust is removed from the skins by putting them through a special drum-shaped screen called a shaker. If such a drum is not available the skins should be cleaned with burlap and hung by the nose for a few minutes to dry.

The pelt is finally pulled fur side in or fur side out over a special board for drying. Boards of the proper size and shape can be obtained from supply houses, or can be made in the work shop. Do not overstretch the skin as this tends to make the fur flat and more open in appearance. For best results it is necessary to lift the skin free of the board by the use of long wedges on each side. This permits circulation of air, and is especially desirable if the skin is handled with the fur out, an increasingly common custom, particularly with mutation skins. To make the skin attractive in appearance it is essential that the pelt be placed on the board straight and that the rear legs be arranged in line with the sides of the skin. A good tailoring job will pay dividends. Tack the pelt to the board and set aside to dry away from stove and open blaze. Circulating air at about 65° F. is ideal.

The Fleshing Pole

The desire to market neat, uniform, grease-free pelts and to facilitate fleshing operations has resulted in the development by mink ranchers of several different types of fleshing poles. One of these types shown in figure 20 has proved to be very satisfactory. The fleshing or pelting poles, or pins, are made from sound straight-grained ash or maple blocks, 39½ inches long and 3⅝ inches square for males, and 36 inches long and 2¾ inches square for females. The blocks are turned down in a lathe to the shape and measurements shown in figure 19. Each pin is sanded off smoothly. Three rows of small holes into which nails will fit are drilled equidistant from each other near the large end of the pin. When pelts are slipped on the pelting pin, small nails through the tail and each hind foot keep them out of the scraper's way and hold the skin firmly.

The pin fits into a 17-inch length of 2-inch pipe which, in turn, is attached to a 45° elbow, a 6-inch nipple, and half of a 2-inch flange union. When the union is bolted to a wall or to a similar support, the pin stands out in the clear at a 45° angle, with the nose of the

pelt pointed toward the floor. A small bolt, which fits into an off-center hole through the 17-inch length of pipe, and a groove entirely around the pin, holds the pin in place and allows the skin to be rotated as needed while being scraped, without removal from the pole (fig. 20).

Pelting Boards

Clear-grained pine, fir, or spruce are desirable woods to use in making the pelting boards on which the skins are placed to dry.

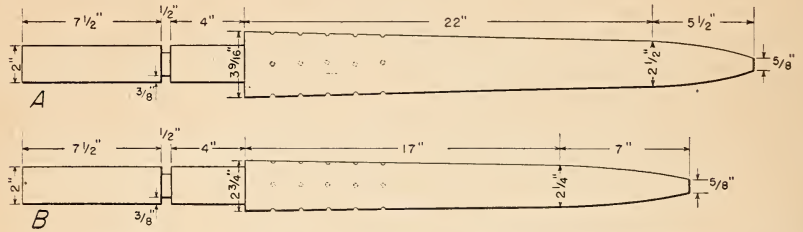

FIGURE 19.—Mink fleshing poles, or pins. *A*, for males; *B*, for females.

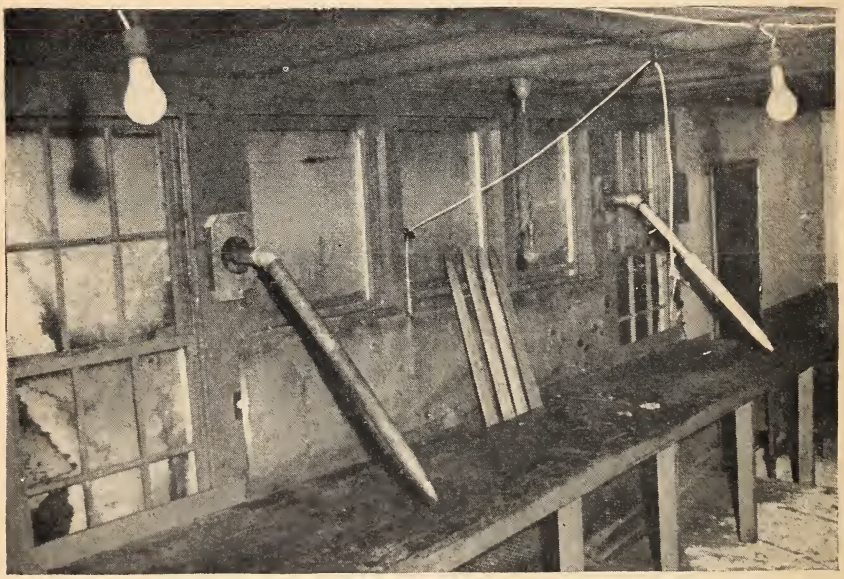

FIGURE 20.—Fleshing poles mounted on wall at convenient angle for operations. Note different sized pelting boards at center.

Material used should be $\frac{5}{16}$ inch thick after dressing. Four sizes are generally needed to handle the skins from an average herd of mink. Each board tapers gradually in width, from the wide end, or base, to the tip, which is rounded to fit the head. The edges should be beveled on both faces, beginning ½ inch from the edge and leaving only ⅛ inch of thickness at the edge. The gradual beveling of the boards aids materially in preventing the skin from sticking to the wood.

Cut all boards 34 inches long and to the width indicated in table 2, and draw a line down the exact center. Measure from the base 12, 24, 30, 31, 32, and 33 inches, and mark off on each side of the center line the width necessary for the size board which is to be made. Cut around the pattern thus formed, bevel the edges as previously indicated, bore a 3/8-inch hole 1 inch from the base by which it can be hung up, and stencil or print the size at the base. The board is now completed.

About 20 percent of the total boards should be sizes 1 and 4, and the remaining 80 percent should be equally divided between sizes 2 and 3.

TABLE 2.—*Measurements for mink pelting boards*

Size of board	Width from center line to edge, at base, and at given distances, in inches, from base							
	Base	12	24	30	31	32	33	34
	Inches	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	
1	1 13/16	1 5/8	1 7/16	1 1/4	1 1/8	1	3/4	Rounded end.
2	1 15/16	1 3/4	1 1/2	1 5/16	1 1/4	1	3/4	Do.
3	2 1/16	1 7/8	1 5/8	1 3/8	1 1/4	1 1/16	3/4	Do.
4	2 3/16	2	1 11/16	1 7/16	1 5/16	1 1/8	7/8	Do.

MARKETING PELTS

There has been considerable controversy over the question of marketing mink skins with the flesh side out or fur side out. The earlier procedure with wild as well as ranch mink was to put the flesh side out. If the skins are to exchange hands frequently the fur on the inside is protected. Expert furriers claim they can obtain a true picture of the entire mink skin by grasping the skin from the top of the rump and bending it back. Frequently, however, some of the skins have been ripped up the belly, the prospective buyer not being able to satisfy his judgment by examination of the rump alone.

If mink skins are to be sold promptly, dressing with the fur out facilitates a more careful examination of color and density of fur. This method does, however, expose the guard hairs to frequent rubbing which may cause the tips to curve. This condition is known as "singed" and very materially affects the price. Skins with the fur out are more difficult to dry properly. In fact because of the numerous tainted skins resulting from placing the fur out, this practice has been largely discontinued. If the fur farmer desires to handle his mink skins this way, extra precautions should be taken to get circulation of air between the fresh pelt and the pelting board by careful use of wedges on each side. It will be well for the mink rancher to consult with the agency marketing his skins to determine the preferred method of handling so that maximum returns may be obtained.

It is essential, however, that pelts from mutation mink be sold with fur out because of the importance of shades of color and pattern

in this type of skin. Dressing seems to show up the desirable, attractive qualities of the mutation fur to better advantage. However, the mink breeder may prepare his mutation skins with fur in as a protection to them and for convenience in drying, until after dressing in preparation for sale.

Mink skins may be marketed through the associations and auction houses, or direct to raw-fur dealers or manufacturers. As most mink skins are used for making coats, the best prices may be obtained for skins that are matched for color, quality, and other desirable factors, and are in one bundle containing sufficient quantities to make a garment, or about 30 to 90 skins. As the small producer is not able to do this, he will benefit by selling through agencies that can place similar skins together from different ranches. Mutation mink breeders pool their skins for selling because of the small quantities initially offered for sale and because of the extreme variability of this new type of skin.

It would be beneficial to the fur farmer to visit his selling agency, observe the grading, and obtain detailed information on specific skins. This will guide him in selecting breeding stock. If each skin carries an identification mark, a market report showing the classification of each skin will be of inestimable value in determining which breeding stock is producing the most valuable skins.

ALASKA CONDITIONS

Many inquiries are received about raising mink in Alaska. Mink ranches of the Territory are located along the coastal area of southern and southeastern Alaska, in the vicinity of the small towns which are all more or less dependent upon the fishing industry. The general principles of mink raising as given in this publication are applicable in Alaska with the exception of the rations fed. Alaskans are dependent upon feeding rations containing high percentages of ocean fish, and cannery and cold storage fish scrap and trimmings, in lieu of the horse meat and other animal proteins usually fed in the States. All manufactured feed ingredients such as cereals and vitamin supplements as well as other fur-farming equipment must be shipped in from the States. For more specific information on mink ranching in Alaska, write the Alaska Experimental Fur Station, Petersburg, Alaska.

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